A330
TECHNICAL TRAINING MANUAL
MECHANICAL & AVIONICS COURSE - T1+T2 (LVL 2&3)
(RR Trent 700)
ONBOARD MAINTENANCE SYSTEMS

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G9409341 - GAUT0T0

ONBOARD MAINTENANCE SYS LINE MAINT BRIEFING (2)

ACQUISITION

The acquisition of A/C system data is done by 4 major electronic systems:
- the ECAM system that monitors the operational data in order to display warnings and system information in normal and abnormal situations,
- the Flight Data Recording System (FDRS), which is mandatory, records A/C operational parameters for incident investigation,
- the Central Maintenance System (CMS) that monitors the various systems BITE data in order to record the system failures,
- the Aircraft Condition and Monitoring System (ACMS) that records significant operational parameters in order to monitor the engines, the aircraft performance and to analyze specific A/C problems.

RETRIEVAL

All the information can be retrieved through:
- the ECAM displays,
- the MCDUs,
- the printer,
- the Air Traffic Service Unit (ATSU) to a ground station, via the Aircraft Communication Addressing and Reporting System (ACARS) function,
- the downloading system and the recorders.

ANALYSIS

Maintenance operations can be divided into three groups:
- short-term troubleshooting, which is done with the help of the ECAM and the CMS through the MCDUs and the printed or ATSU down-linked reports via the ACARS function,
- in-depth troubleshooting, which is done with the help of the CMS and the ACMS through the MCDUs and printed or downloaded reports,
- long-term maintenance, which is done with the help of the ACMS and the FDRS ATSU down-linked and downloaded reports or recorded data.

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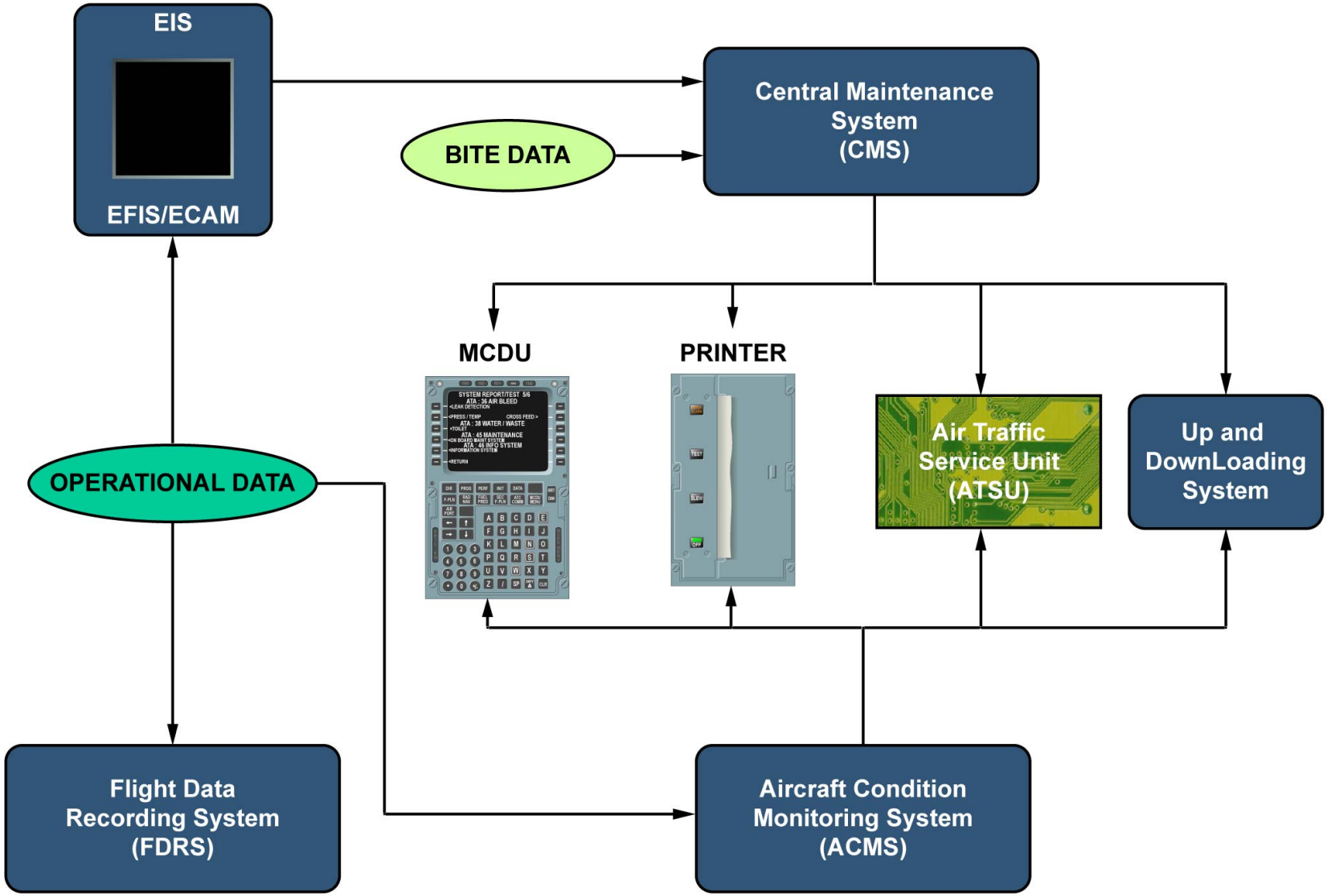

ACQUISITION ... ANALYSIS

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ONBOARD MAINTENANCE SYS LINE MAINT BRIEFING (2)

COCKPIT EFFECT

After a malfunction, the crew reports the cockpit effect in the log book. The fault symptoms, relative to the cockpit effect, can be as follows:
- a warning/malfunction + CMS Fault message (with possible related warnings and system identifiers),
- a warning/malfunction alone,
- a CMS fault message alone.

POST FLIGHT REPORT

For the class 1 and 2 failures of CMS monitored systems, the Post Flight Report (PFR) gives access to the concerned list of faults in the Trouble Shooting Manual (TSM). For this function, it gives information including ECAM warning messages, if any exist, fault messages with their source, ATA references and IDENTIFIERS LIST. When the PFR printout is not available, this information can be retrieved through the MCDU, in normal mode or Interactive mode. A specific document (SIL 00-038 for A340 200/300, SIL 00-078 for A 340 500/600 and SIL 00-041 for A330) and the maintenance knowledge will be used to remove spurious messages.

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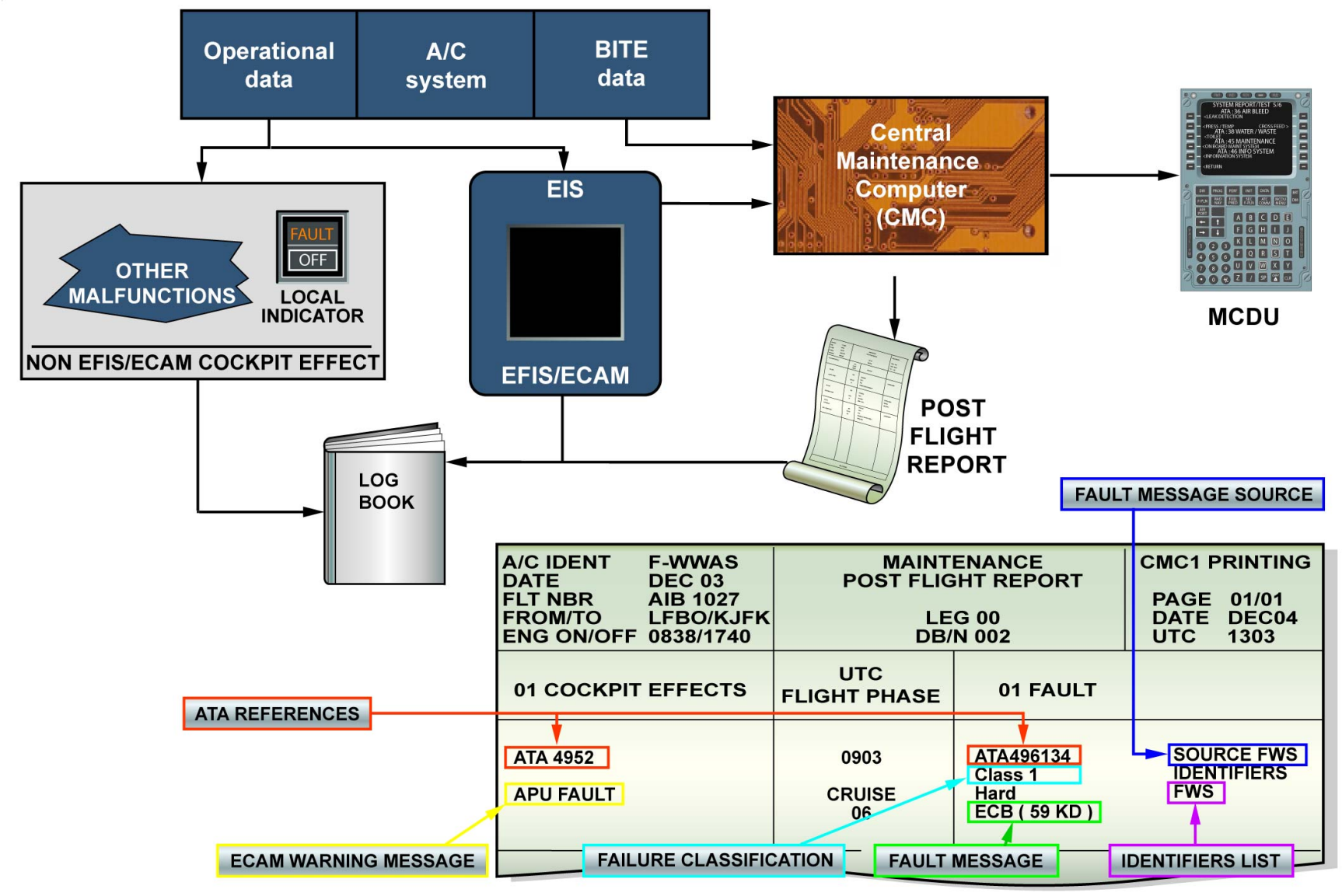

COCKPIT EFFECT & POST FLIGHT REPORT

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ONBOARD MAINTENANCE SYS LINE MAINT BRIEFING (2)

TROUBLE SHOOTING MANUAL ENTRY

The CMS report information gives direct access to the fault isolation procedure task numbers in page block 101 of the TSM. You have to refer to the "WARNINGS/MALFUNCTIONS" column to find the reported problem. If the fault symptoms such as ECAM, Electronic Flight Instrument System (EFIS), local warning, crew observation or CMS do not let directly find the right page block 101, you can refer to the related section of the index part. Then you link the CMS message. A WARNINGS/MALFUNCTIONS with its correlated CMS fault message could have several related fault isolation procedure tasks according to the systems which have detected the fault. The PFR gives an identifiers list, which must be compared with the identifiers item of the CMS fault messages part in page block 101 of the TSM. This task number gives the right access for page block 201 of the TSM.

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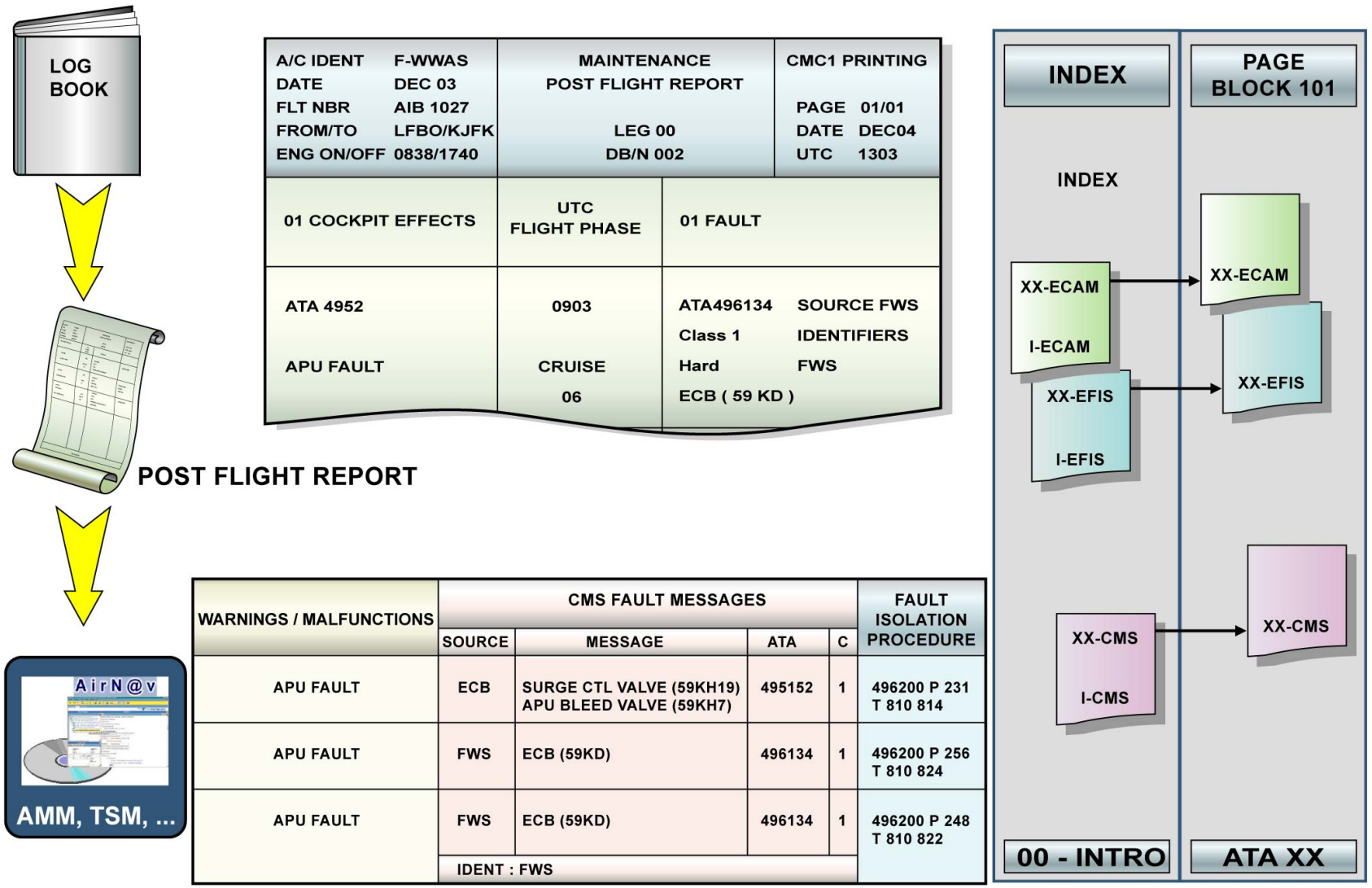

TROUBLE SHOOTING MANUAL ENTRY

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ONBOARD MAINTENANCE SYS LINE MAINT BRIEFING (2)

FAULT ISOLATION PROCEDURE

The related fault isolation procedure task in page block 201 of TSM has a presentation of possible causes and the fault confirmation, for example by an operational test, power-up test or ground scanning. It also gives the fault isolation procedure including Line Replaceable Unit (LRU) removal/installation, wiring check, etc. In addition, a list of useful aircraft documentation references is given in the TSM.

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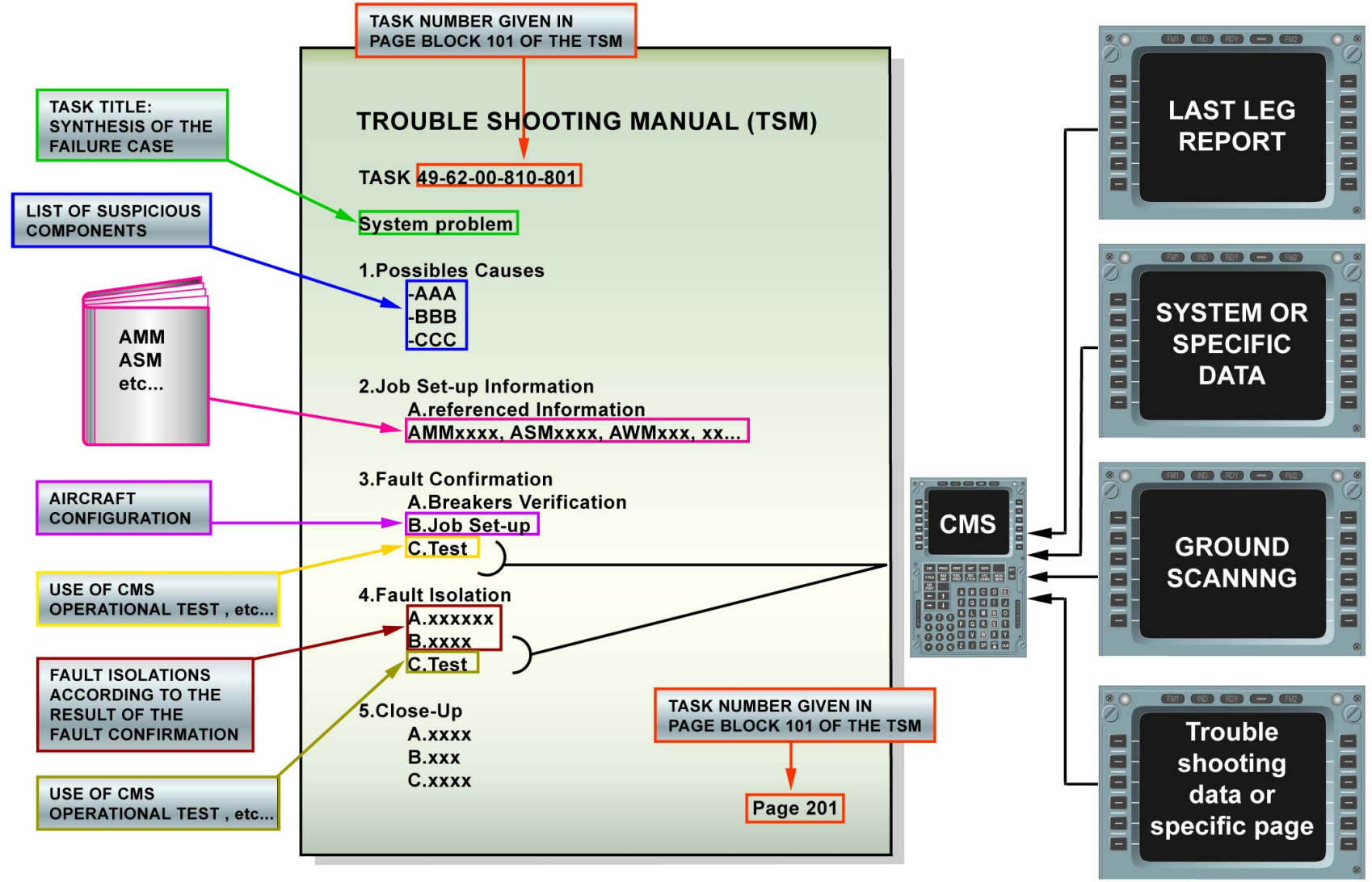

FAULT ISOLATION PROCEDURE

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ONBOARD MAINTENANCE SYS LINE MAINT BRIEFING (2)

PROCEDURE TO LOAD THE DB OF THE CMC (DLS/DLRB)

The Central Maintenance Computer (CMC) DataBase (DB) is made up of a CMC filter DB, a servicing report DB and a diskette configuration DB. Each DB must be individually prepared prior to the loading of the entire CMC DB, by using the related maintenance tool.

NOTE: This procedure is similar for any computer, which can receive uploads through the up and down loading system.

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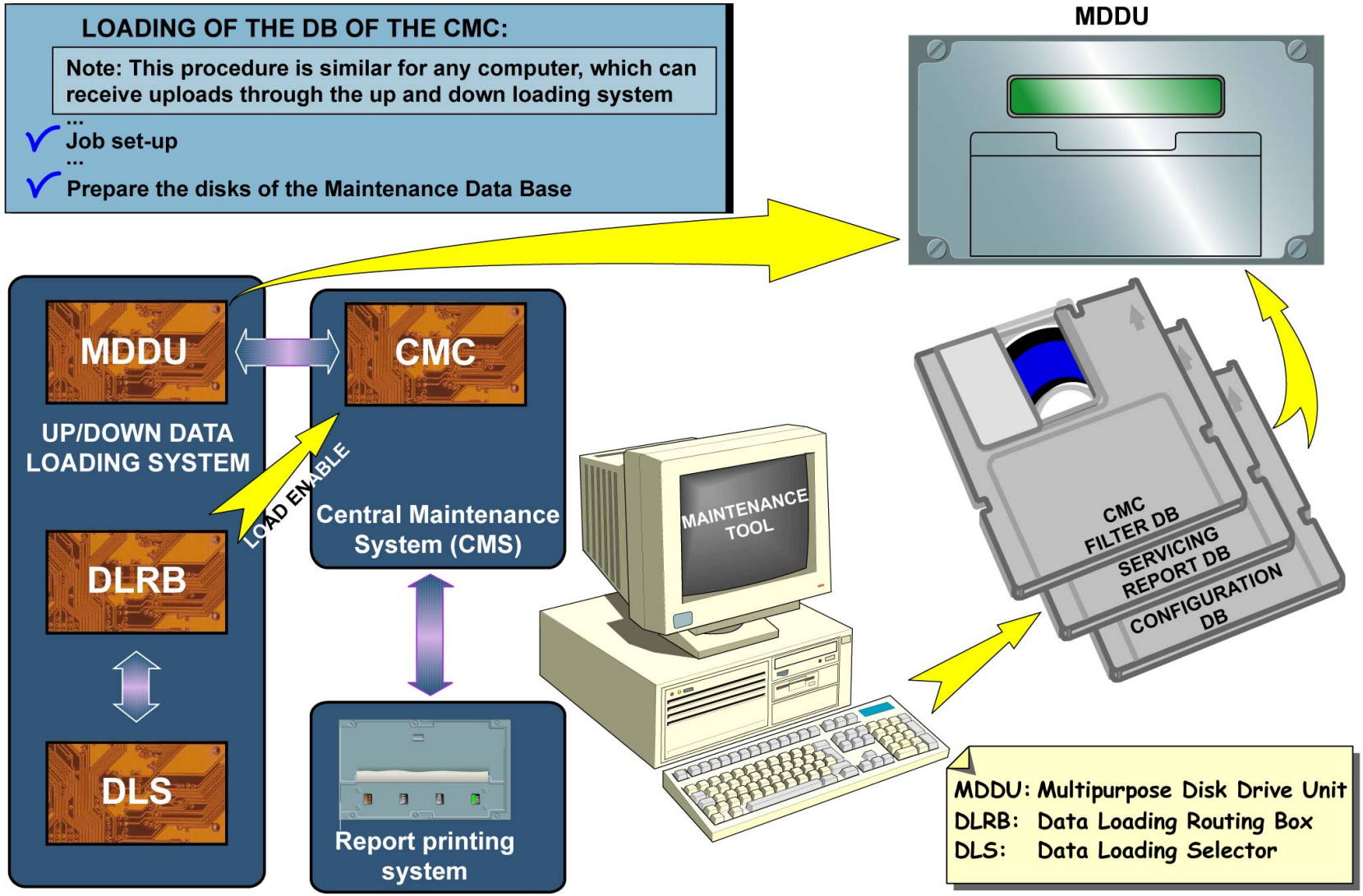

PROCEDURE TO LOAD THE DB OF THE CMC (DLS/DLRB)

ONBOARD MAINTENANCE SYS LINE MAINT BRIEFING (2)

PROCEDURE TO LOAD THE DB OF THE CMC (DLS/DLRB) (continued)

LOADING OF THE DB OF THE CMC

Switch the Data Loading Selector (DLS) ON and check that Multipurpose Disk Drive Unit (MDDU) is ready.

NOTE: This procedure is similar for any computer, which can receive uploads through the up and down loading system.

Reset the CMC by using the C/B.
Insert the prepared disk into the MDDU.
Monitor the DB transfer and make a check on completion until "TRANSFERT COMPLETE",

NOTE: If a problem occurs during the uploading procedure and the TRANSFER COMPLETE indication is not shown at the end, you must do the procedure again in order to make sure that the computer is fully loaded with data.

Wait for completion of the automatic DB content printout and remove the disk, switch the DLS OFF, the DB of the CMC is now loading.

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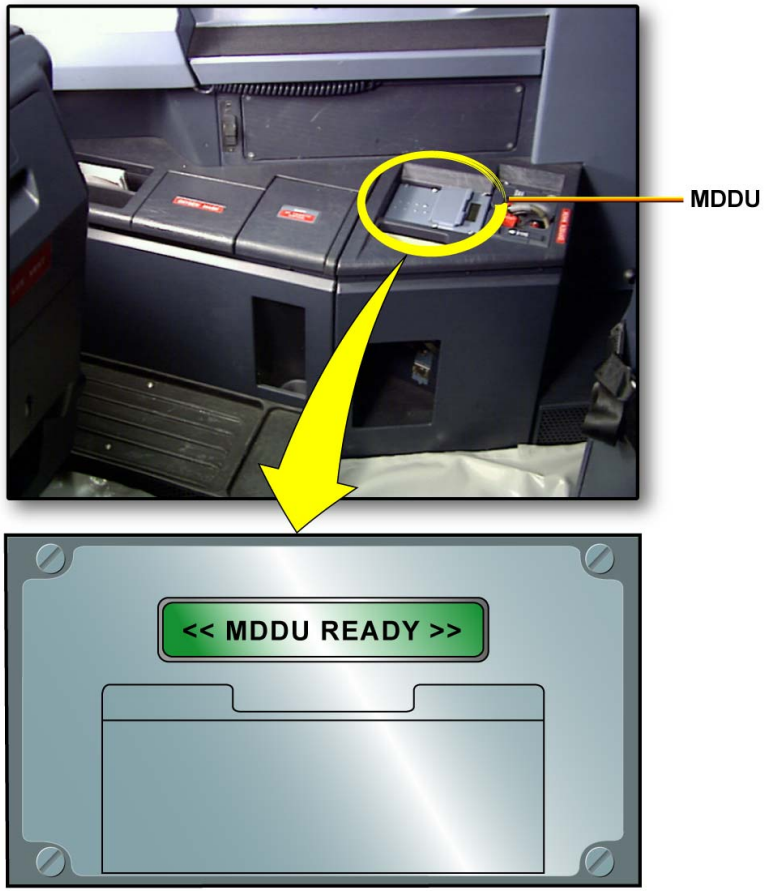
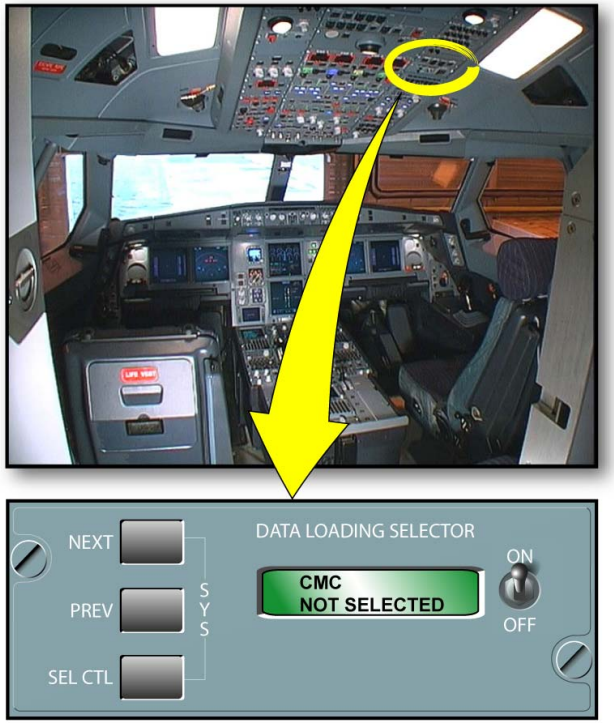
LOADING OF THE DB OF THE CMC:

- ✓ On the DLS: set the ON / OFF switch to ON
- ✓ On the DLS: push the PREV or NEXT key until you get the CMC indication





PROCEDURE TO LOAD THE DB OF THE CMC (DLS/DLRB) - LOADING OF THE DB OF THE CMC

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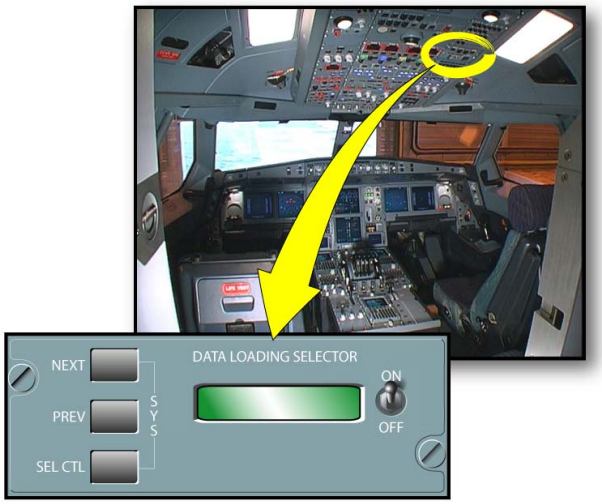
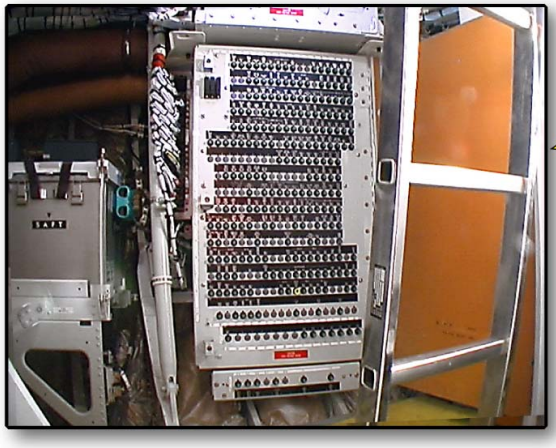
LOADING OF THE DB OF THE CMC:

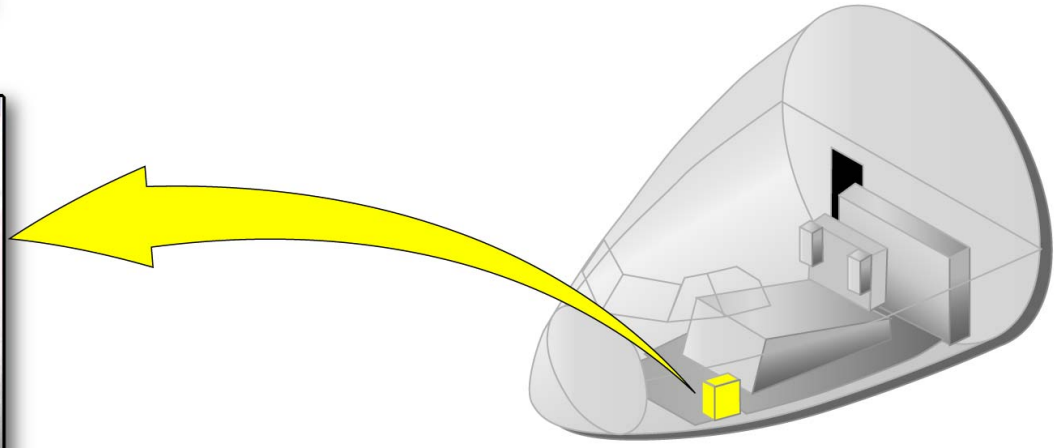
...

- ✓ Open the C/B 3TM1 (742VU)
- ✓ Close the C/B 3TM1

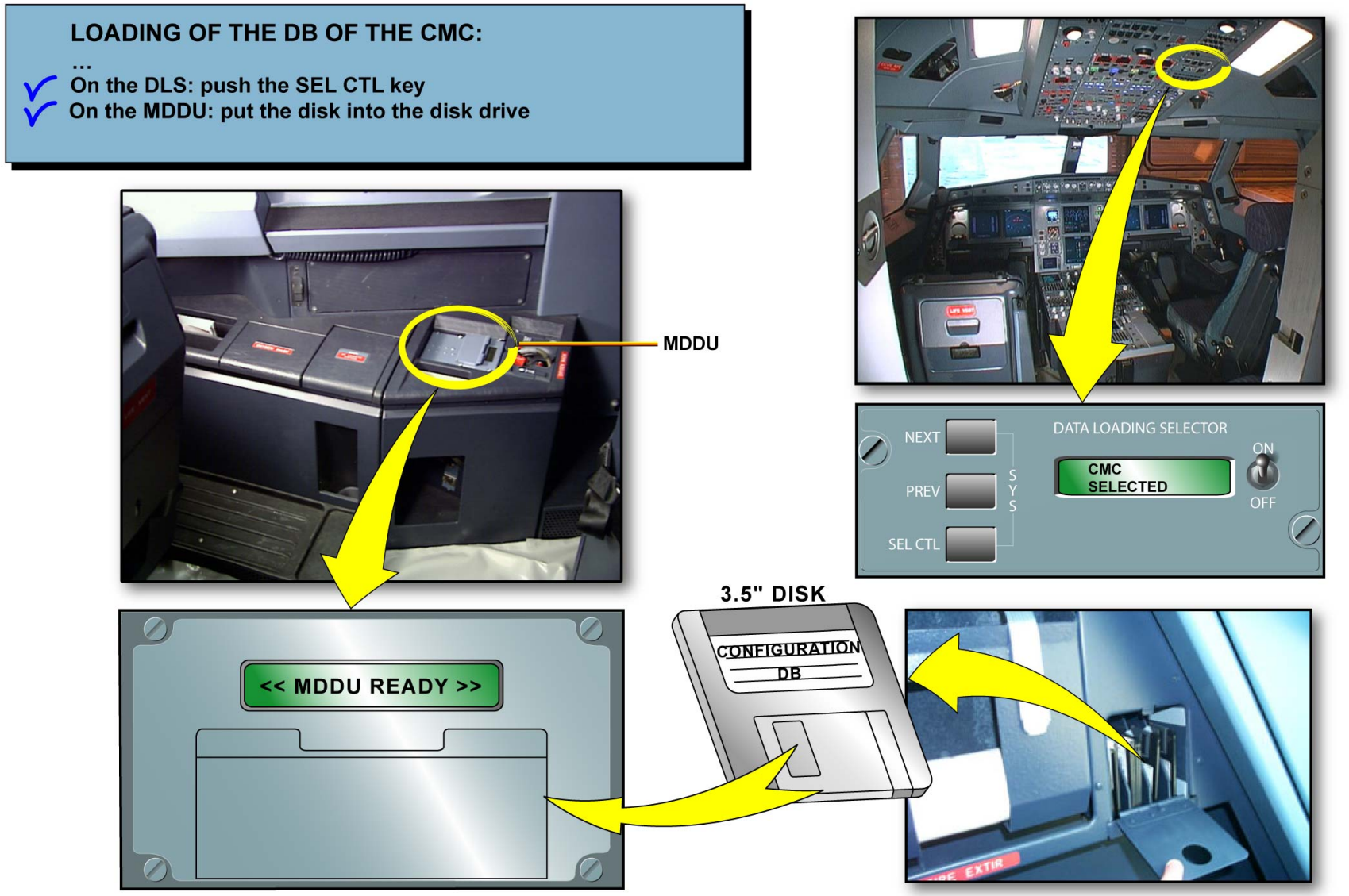


742VU





PROCEDURE TO LOAD THE DB OF THE CMC (DLS/DLRB) - LOADING OF THE DB OF THE CMC



PROCEDURE TO LOAD THE DB OF THE CMC (DLS/DLRB) - LOADING OF THE DB OF THE CMC

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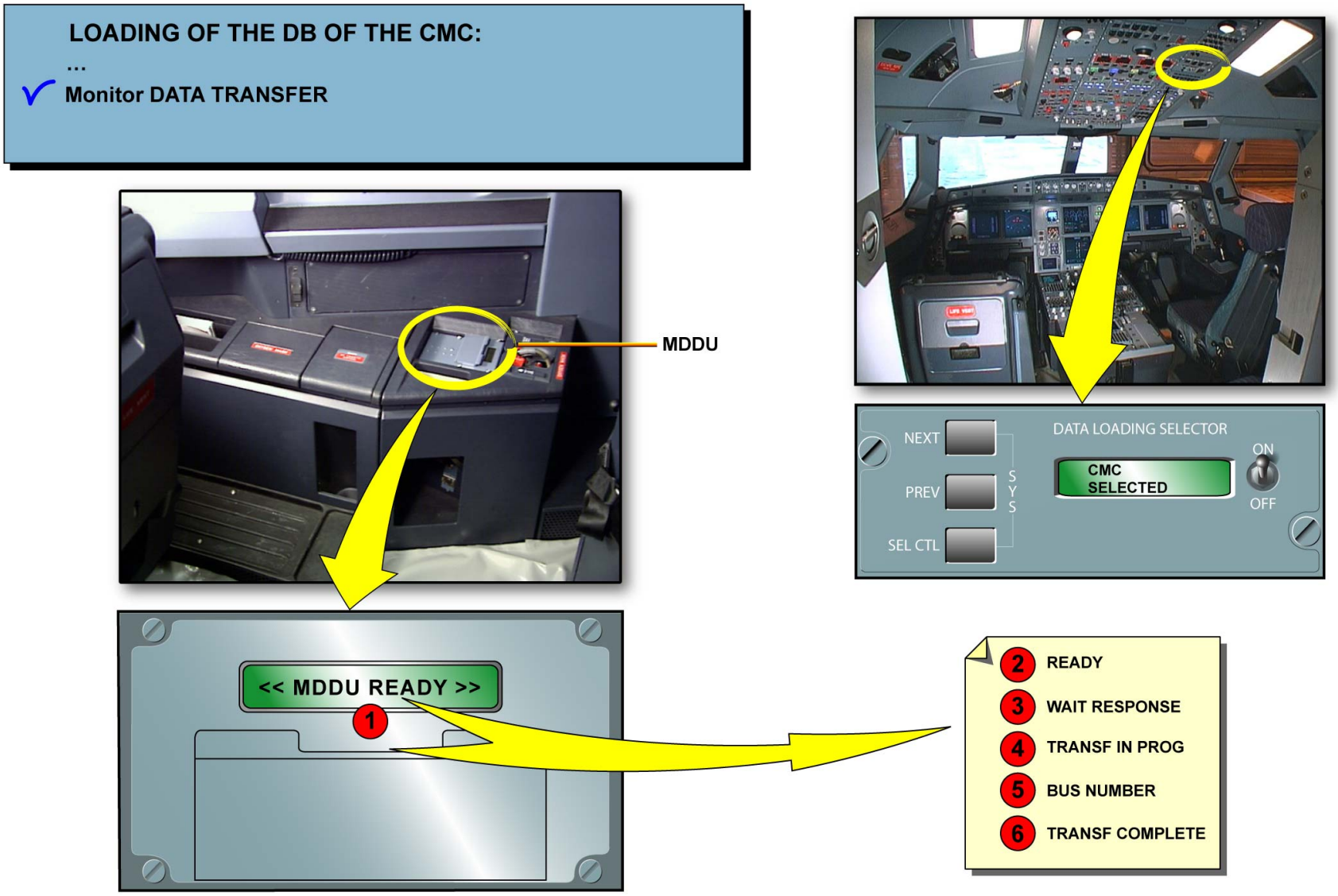

PROCEDURE TO LOAD THE DB OF THE CMC (DLS/DLRB) - LOADING OF THE DB OF THE CMC

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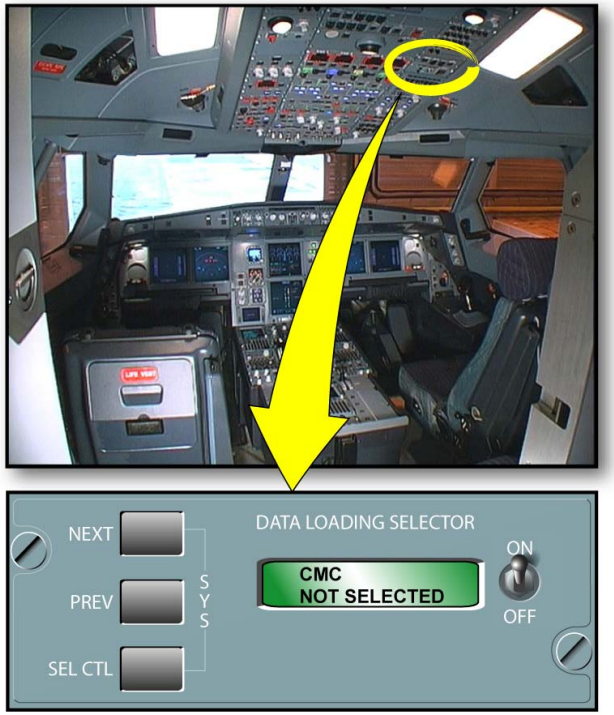
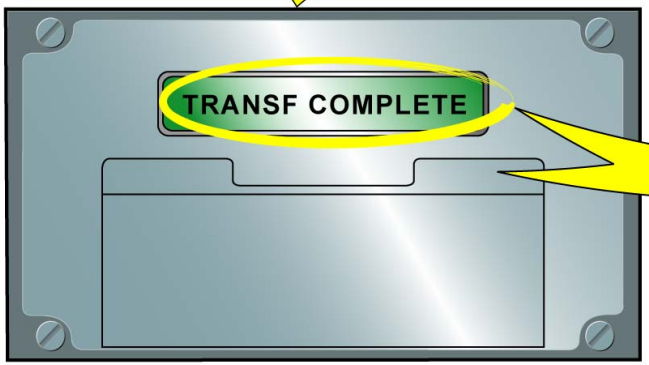
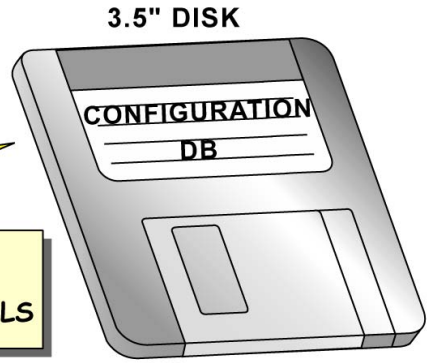
LOADING OF THE DB OF THE CMC:

...

- ✓ On the DLS: push the SEL CTL key
- ✓ When the automatic printing is completed, on the MDDU remove the disk from the disk drive







When the loading is completed, don't forget to switch off the DLS

PROCEDURE TO LOAD THE DB OF THE CMC (DLS/DLRB) - LOADING OF THE DB OF THE CMC

ONBOARD MAINTENANCE SYS LINE MAINT BRIEFING (2)

PROCEDURE TO LOAD THE DB OF THE CMC (DLS/DLRB) (continued)

DO A CHECK ON THE MCDU OF THE REFERENCE OF THE DATA LOADED INTO THE CMC

From the SYSTEM REPORT/TEST page get access to the CMC BITE menu. Make sure that the DB reference shown on the LRU IDENT page is the same as the disk DB reference. Return to the SYSTEM REPORT/TEST page. Do the same check for opposite CMC. Put the A/C back to its initial configuration.

NOTE: Note: The three first digits refer to the CMC filter DB Number (DB/N), the three following ones refer to the servicing report DB and the three last digits to the diskette configuration DB.

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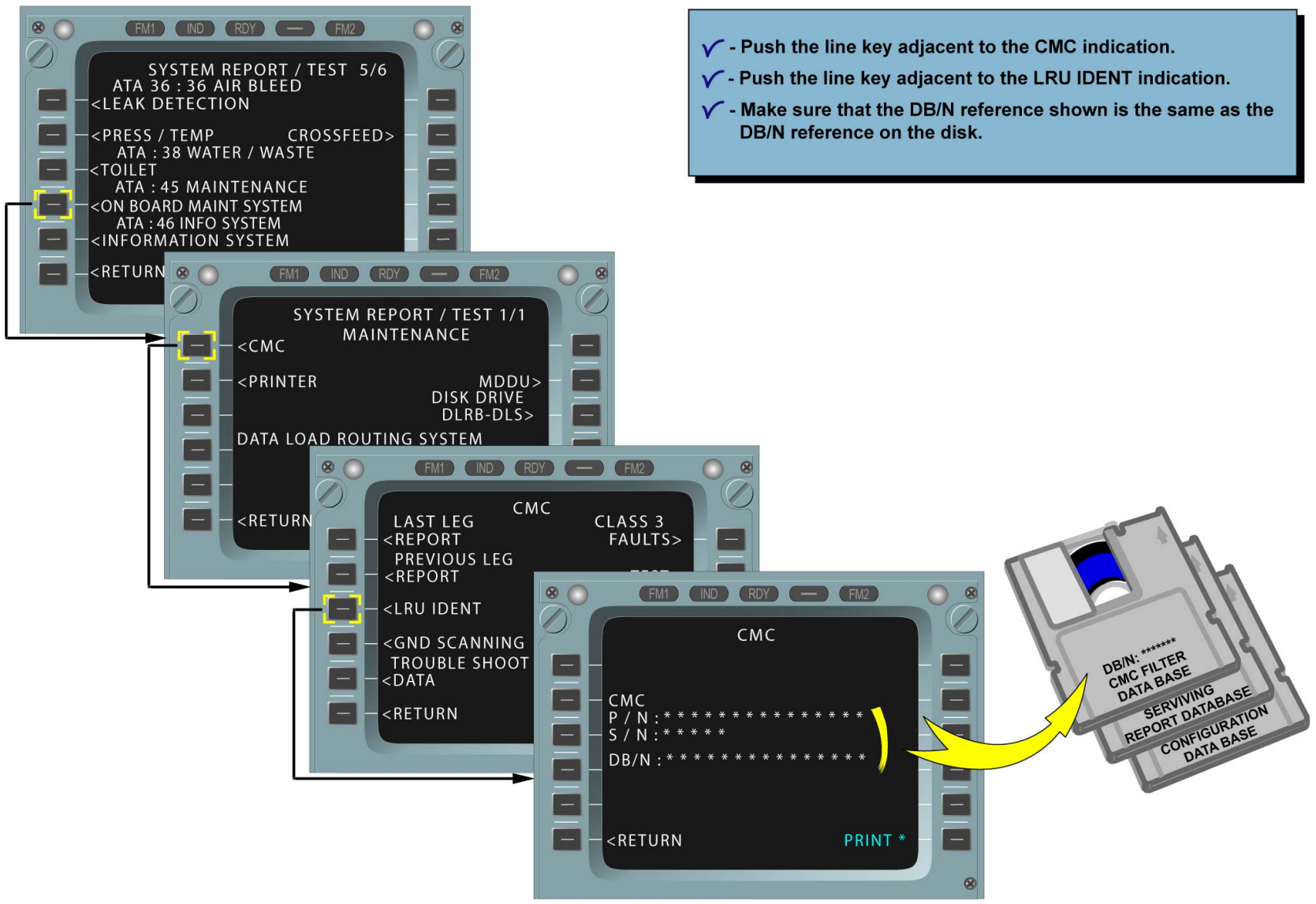

PROCEDURE TO LOAD THE DB OF THE CMC (DLS/DLRB) - DO A CHECK ON THE MCDU OF THE REFERENCE OF THE DATA LOADED INTO THE CMC

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ONBOARD MAINTENANCE SYS LINE MAINT BRIEFING (2)

ENABLE/DISABLE OF THE FLIGHT REPORT FILTER

From the second page of the maintenance menu access the first REPORT PROGRAMMING page. Push the filter activated toggle key to activate or inhibit the flight report filtering. Check the MCDU programming display for confirmation: YES (activation) or NO (inhibition). Put the A/C back to its initial configuration.

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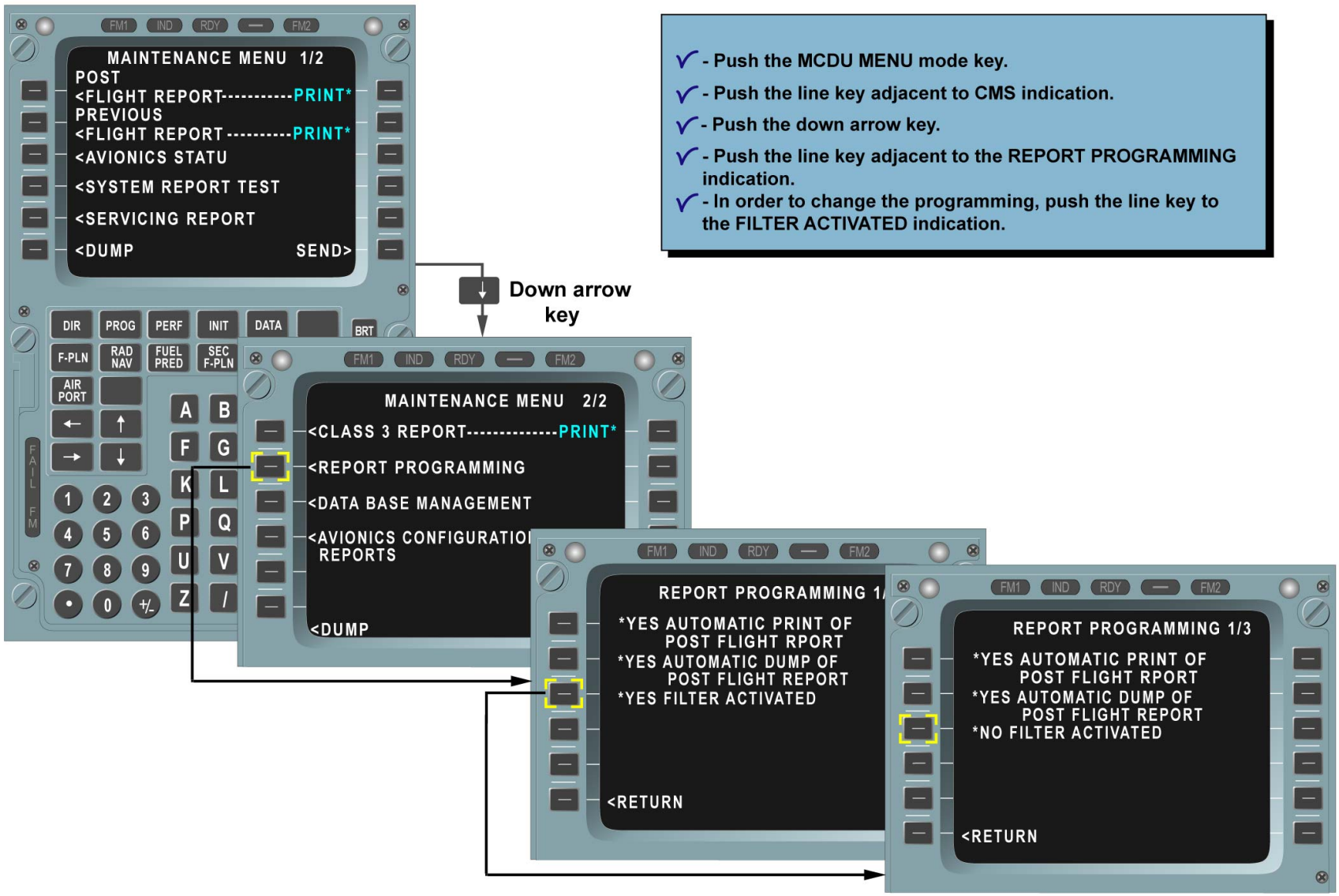
✓ - Push the MCDU MENU mode key.
✓ - Push the line key adjacent to CMS indication.
✓ - Push the down arrow key.
✓ - Push the line key adjacent to the REPORT PROGRAMMING indication.
✓ - In order to change the programming, push the line key to the FILTER ACTIVATED indication.
Down arrow key
MAINTENANCE MENU 1/2
POST
<FLIGHT REPORT----------PRINT*
PREVIOUS
<FLIGHT REPORT ---------PRINT*
<AVIONICS STATU
<SYSTEM REPORT TEST
<SERVICING REPORT
<DUMP SEND>
MAINTENANCE MENU 2/2
<CLASS 3 REPORT----------PRINT*
<REPORT PROGRAMMING
<DATA BASE MANAGEMENT
<AVIONICS CONFIGURATIO
REPORTS
<DUMP
REPORT PROGRAMMING 1/
*YES AUTOMATIC PRINT OF POST FLIGHT RPORT
*YES AUTOMATIC DUMP OF POST FLIGHT REPORT
*YES FILTER ACTIVATED
<RETURN
REPORT PROGRAMMING 1/3
*YES AUTOMATIC PRINT OF POST FLIGHT RPORT
*YES AUTOMATIC DUMP OF POST FLIGHT REPORT
*NO FILTER ACTIVATED
<RETURN

ENABLE/DISABLE OF THE FLIGHT REPORT FILTER

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ONBOARD MAINTENANCE SYS LINE MAINT BRIEFING (2)

ENABLE/DISABLE OF THE SERVICING REPORT (COUPON OR COMPLETE MODE)

From the second page of the maintenance menu access the second REPORT PROGRAMMING page. Push the SERVICING COUPONS toggle key to change the servicing report programming. Check the MCDU programming display for confirmation: YES (coupon mode active) or NO (complete mode active). Put the A/C back to its initial configuration.

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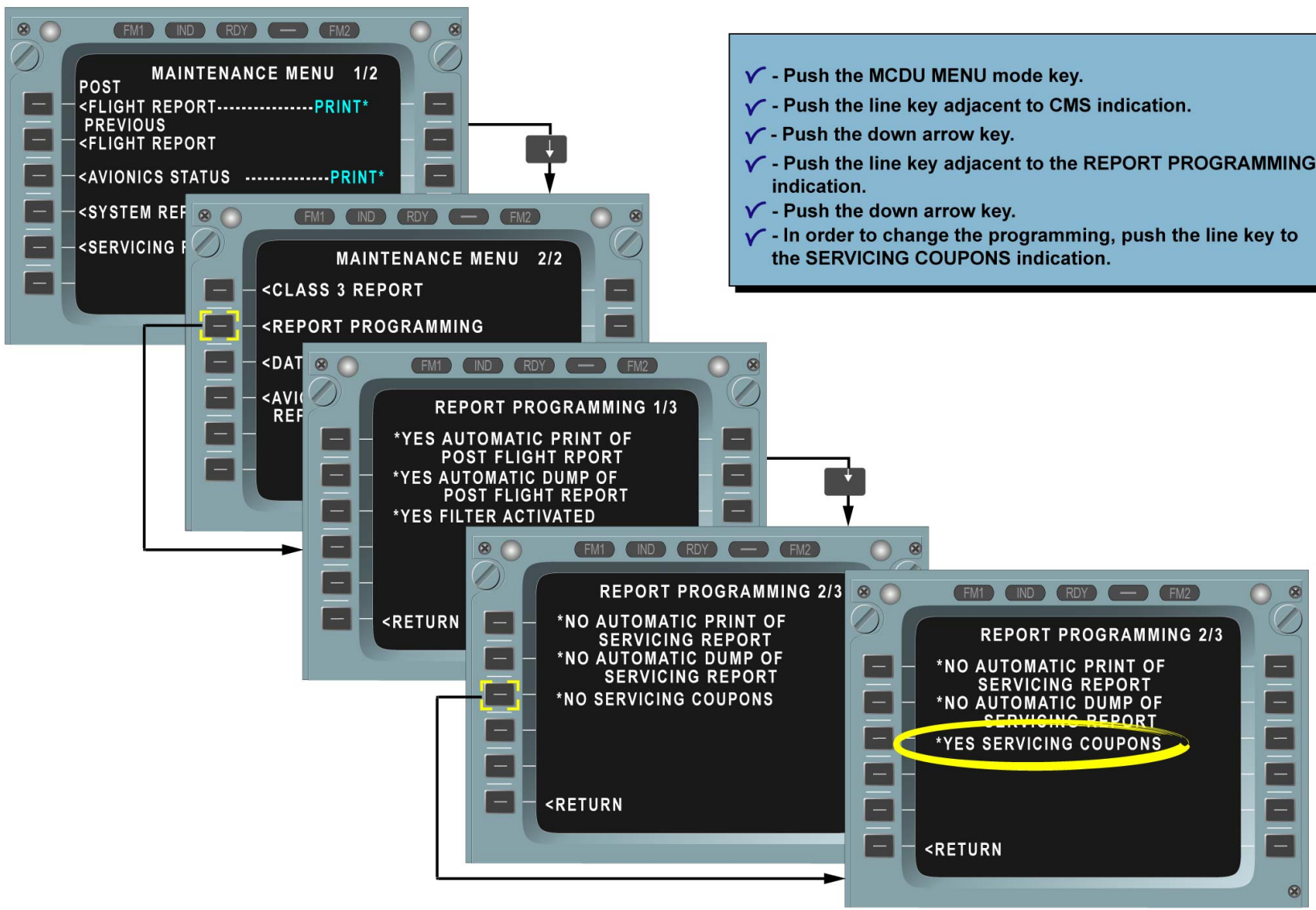
- Push the MCDU MENU mode key.
- Push the line key adjacent to CMS indication.
- Push the down arrow key.
- Push the line key adjacent to the REPORT PROGRAMMING indication.
- Push the down arrow key.
- In order to change the programming, push the line key to the SERVICING COUPONS indication.
MAINTENANCE MENU 1/2
POST
<FLIGHT REPORT----------PRINT*
PREVIOUS
<FLIGHT REPORT
<AVIONICS STATUS ----------PRINT*
MAINTENANCE MENU 2/2
<CLASS 3 REPORT
<REPORT PROGRAMMING
REPORT PROGRAMMING 1/3
*YES AUTOMATIC PRINT OF POST FLIGHT RPORT
*YES AUTOMATIC DUMP OF POST FLIGHT REPORT
*YES FILTER ACTIVATED
<RETURN
REPORT PROGRAMMING 2/3
*NO AUTOMATIC PRINT OF SERVICING REPORT
*NO AUTOMATIC DUMP OF SERVICING REPORT
*NO SERVICING COUPONS
<RETURN
REPORT PROGRAMMING 2/3
*NO AUTOMATIC PRINT OF SERVICING REPORT
*NO AUTOMATIC DUMP OF
*YES SERVICING COUPONS
<RETURN

ENABLE/DISABLE OF THE SERVICING REPORT (COUPON OR COMPLETE MODE)

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ONBOARD MAINTENANCE SYS LINE MAINT BRIEFING (2)

PROCEDURE TO INSTALL PAPER IN THE PRINTER

This is the procedure to install paper in the printer.

REMOVAL OF THE SPOOL

If there is still paper on the spool:
- cut the paper,
- slew the engaged paper until it is fully out.

INSTALLATION OF THE PAPER ROLL

Install the new paper roll in the two grooves. Engage the paper tip in the gap between the two paper guides and push it until it engages automatically. Close the door and check that the paper feeds automatically. Put the A/C back to its initial configuration.

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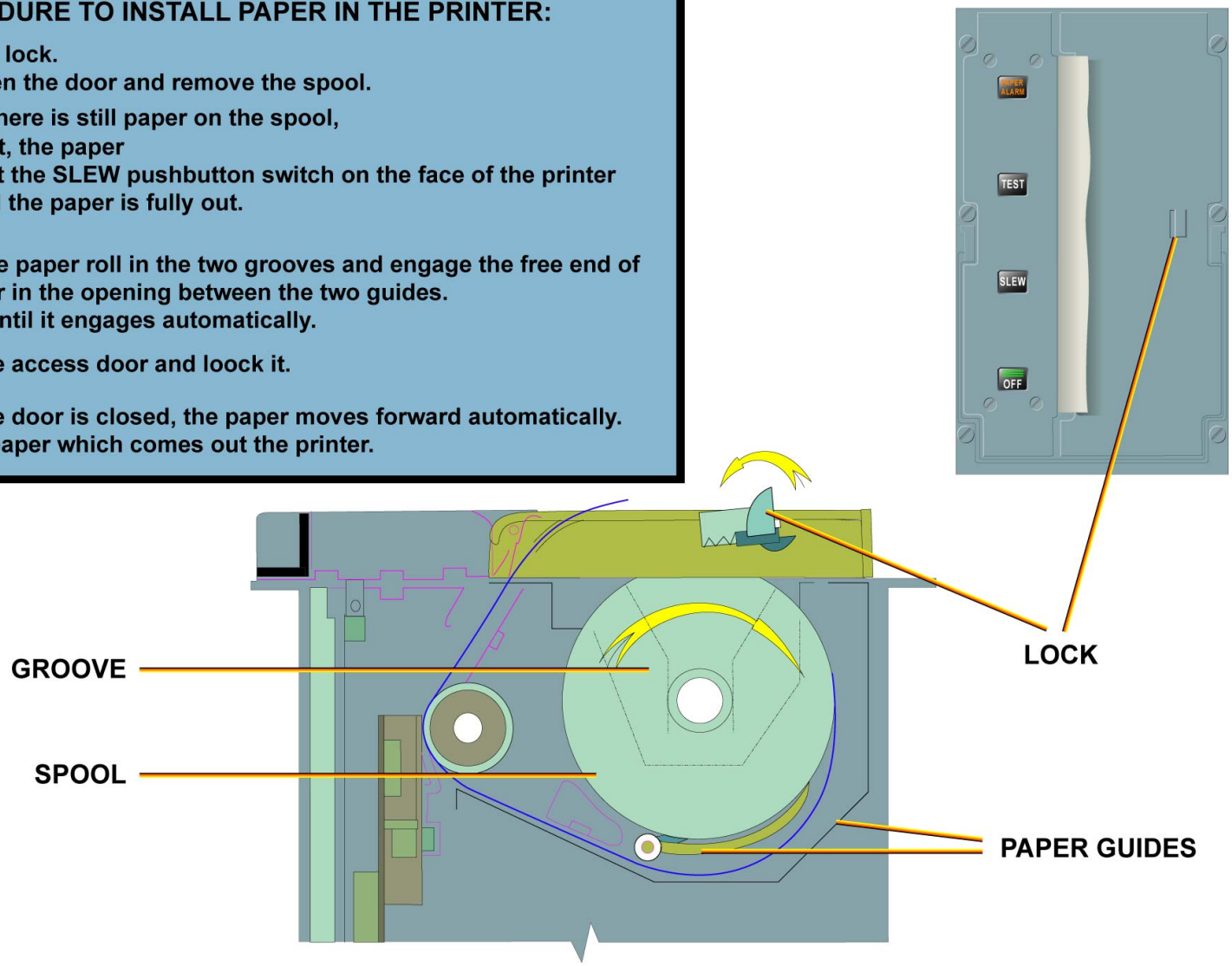
PROCEDURE TO INSTALL PAPER IN THE PRINTER:

- Push the lock.
- Fully open the door and remove the spool.
- Note: If there is still paper on the spool,
  - Cut, the paper
  - Put the SLEW pushbutton switch on the face of the printer until the paper is fully out.
- Install the paper roll in the two grooves and engage the free end of the paper in the opening between the two guides. Push it until it engages automatically.
- Close the access door and loock it.
- When the door is closed, the paper moves forward automatically. Cut the paper which comes out the printer.



PROCEDURE TO INSTALL PAPER IN THE PRINTER - REMOVAL OF THE SPOOL & INSTALLATION OF THE PAPER ROLL

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ONBOARD MAINTENANCE SYS LINE MAINT BRIEFING (2)

MAINTENANCE TIPS

The procedure to replace the paper roll is written at the back of the printer door. At the back of the door, there is also a non-jamming procedure which tells you to press slew and paper alarm together to reverse paper rotation.

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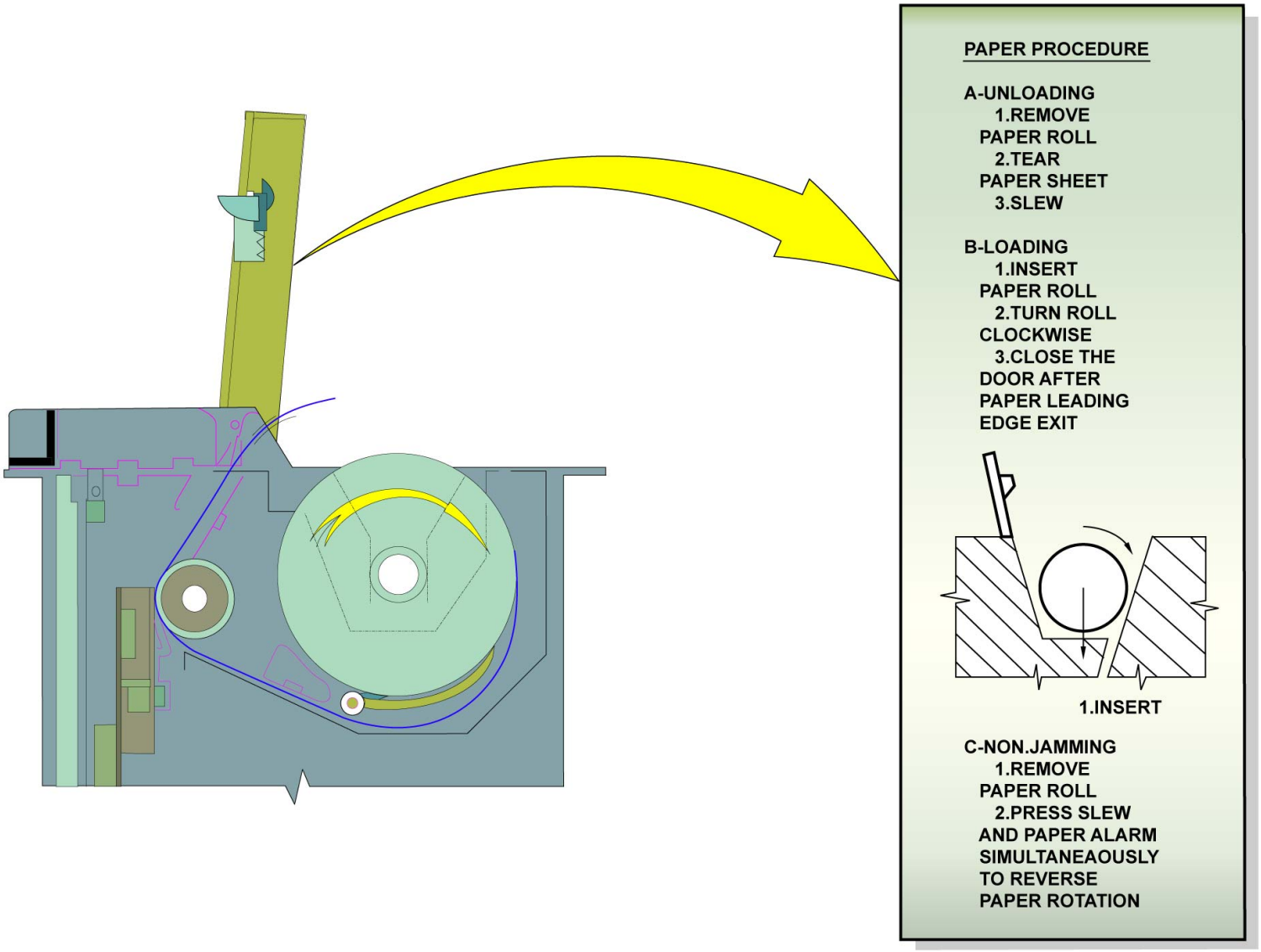

MAINTENANCE TIPS

CMS GENERAL DESCRIPTION (3)

CMS PHILOSOPHY

The Central Maintenance System (CMS) includes the BITE of all electronic systems and a Central Maintenance Computer (CMC). The CMS is used for short-term troubleshooting, Line Replaceable Unit (LRU) removal and system failure analysis or test.
The CMC centralizes and memorizes warnings that the Flight Warning Computers (FWCs) supply and failure messages that the BITE function integrated in the A/C computers sends.
The CMS enables maintenance personnel to do system operational tests, functional checks and read-out of BITE memory through the MCDU. Reports are printed onboard, saved on a floppy disk via the Multipurpose Disk Drive Unit (MDDU) or transmitted to ground through the Air Traffic Service Unit (ATSU). As it is possible to do operational tests from the cockpit, you must obey to safety precautions before doing these tests (displayed on the MCDU).

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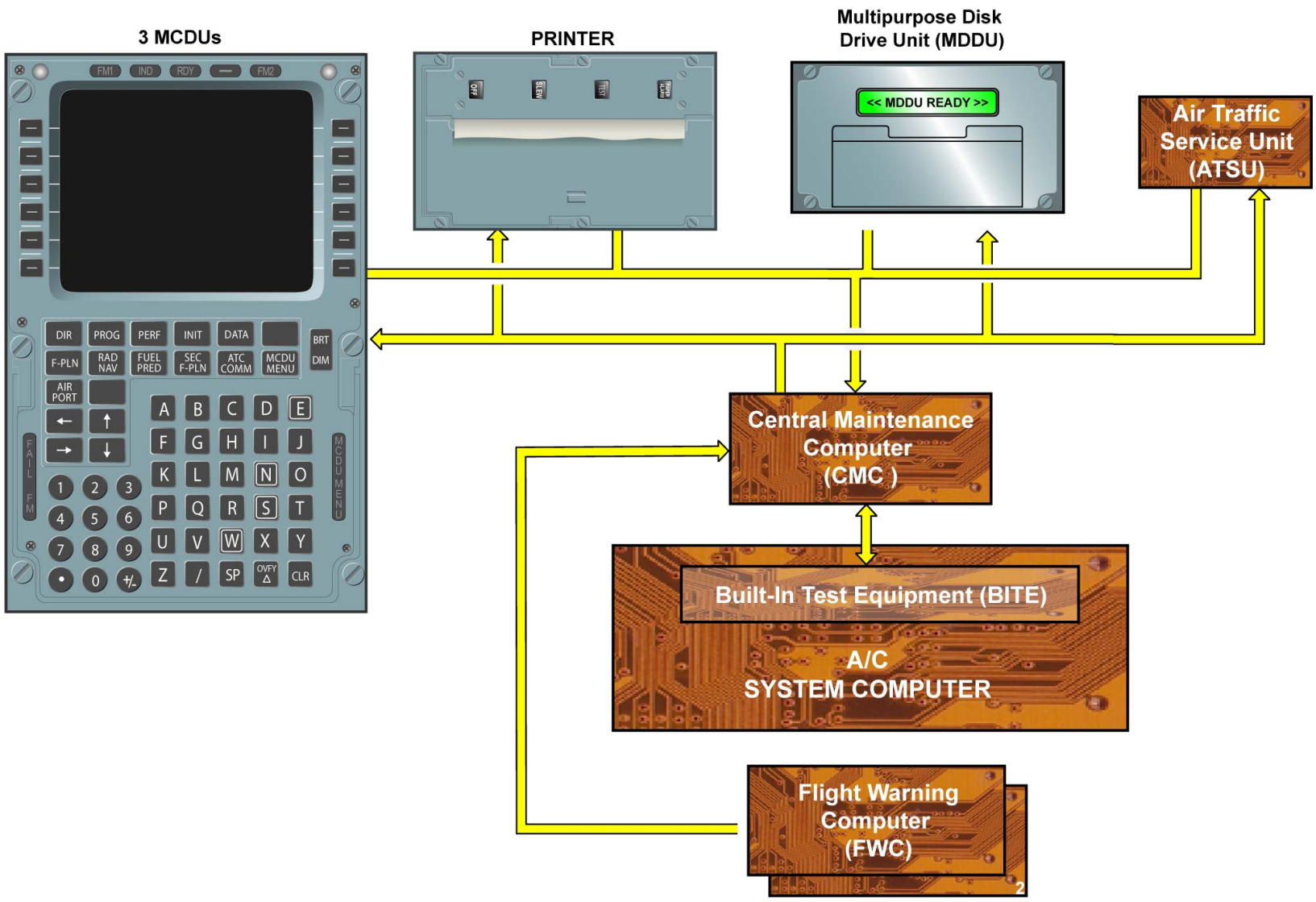

CMS PHILOSOPHY

G9409341 - GAUT0T0 - FM45DE000000002

CMS GENERAL DESCRIPTION (3)

BITE PHILOSOPHY

A system is composed of LRUs , which are:
- computers,
- sensors,
- actuators,
- and probes.

One the computer system function is to detect and memorize any failure occurring within the systems, it is called the BITE.
During normal operation, the system is permanently monitored for:
- fault detection, if a failure occurs, this failure can be permanent or intermittent,
- isolation: after detection, the BITE is able to identify the possible failed LRUs (snapshot of the system environment),
- memorization: a Non Volatile Memory (NVM) memorizes the cause of the failure.

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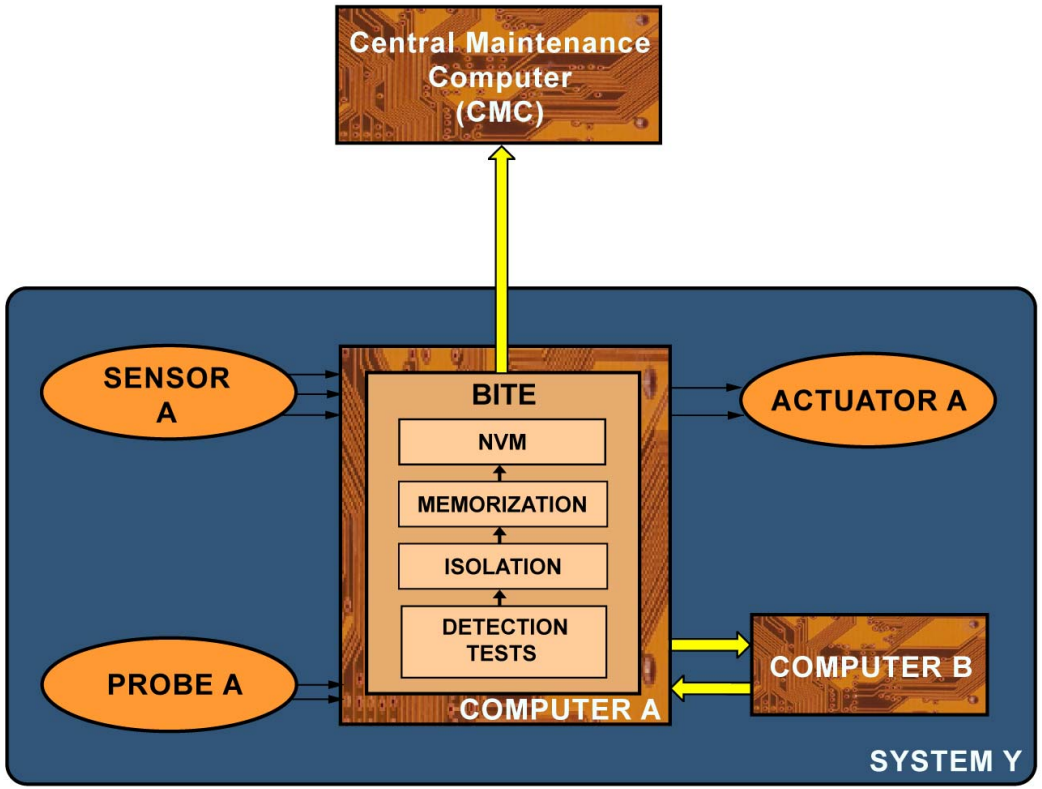

BITE PHILOSOPHY

CMS GENERAL DESCRIPTION (3)

TESTS

The test function, done with the BITE, is divided in 4 groups:
- power-up tests, which are safety tests for system integrity check. These tests are carried out on ground after a power cut off.
The typical tasks of a power-up test are:
- test of the microprocessor,
- test of the memories,
- test of ARINC 429 links,
- input/output circuits and configuration test.
-Cyclic tests are done in flight and do not disturb the system operation. These tests permanently monitor the system.
The typical tasks are:
- watchdog test, and RAM test.
- system tests, done by the maintenance staff to make sure that the systems are safe during the flight and to enable troubleshooting. These tests are carried out on ground.
-Specific tests are available for some systems. They supply stimuli to various command devices such as actuators or valves. These tests can have major effects on the A/C, like automatic moving of slats or flaps, and engine dry cranking. System tests and specific tests are initiated manually via the CMC.

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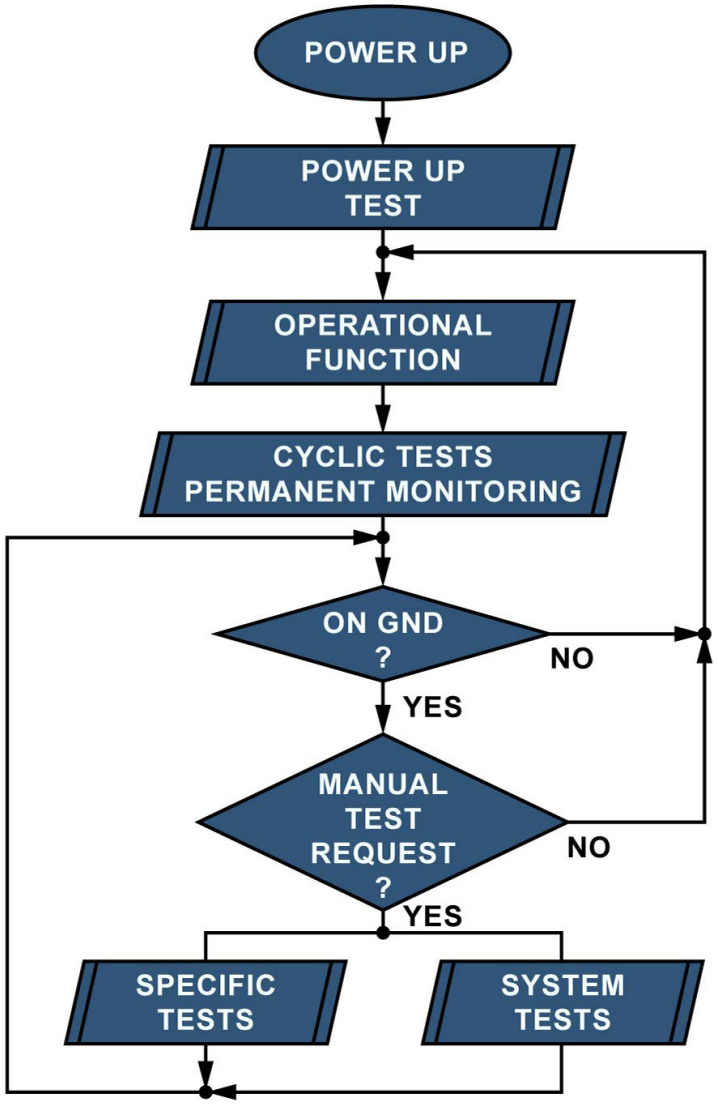


TESTS

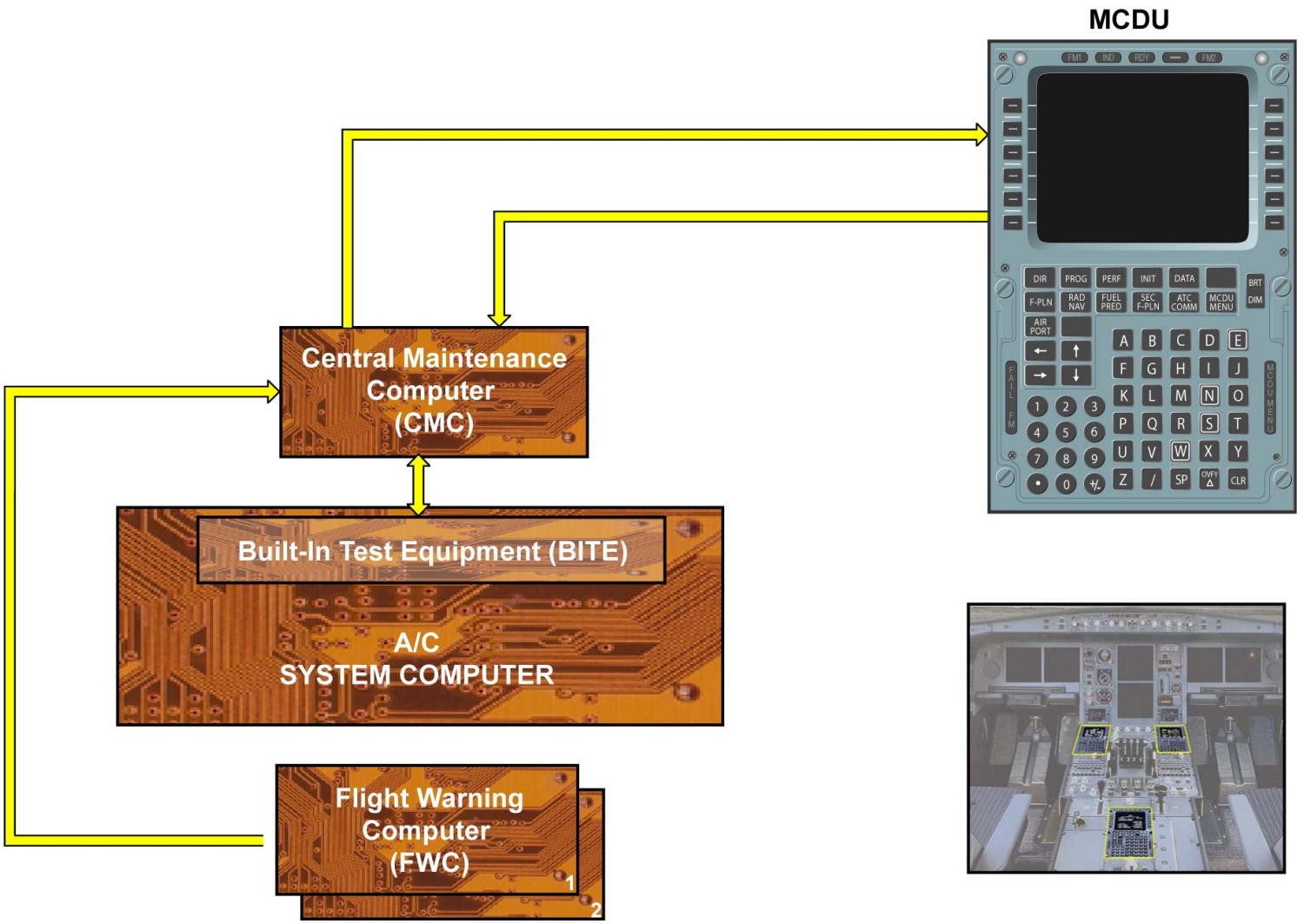
G9409341 - GAUT0T0 - FM45DE000000002

CMS GENERAL DESCRIPTION (3)

CENTRAL MAINTENANCE COMPUTER

The CMC continuously scans the buses from the A/C systems. During flight, if a failure message from a BITE occurs on a bus, the CMC copies and stores this message. The FWCs send warning messages and the CMC stores these messages. The CMS operator' interface is the MCDU. Only two of the three MCDUs available can be operated simultaneously.

G9409341 - GAUT0T0 - FM45DE000000002



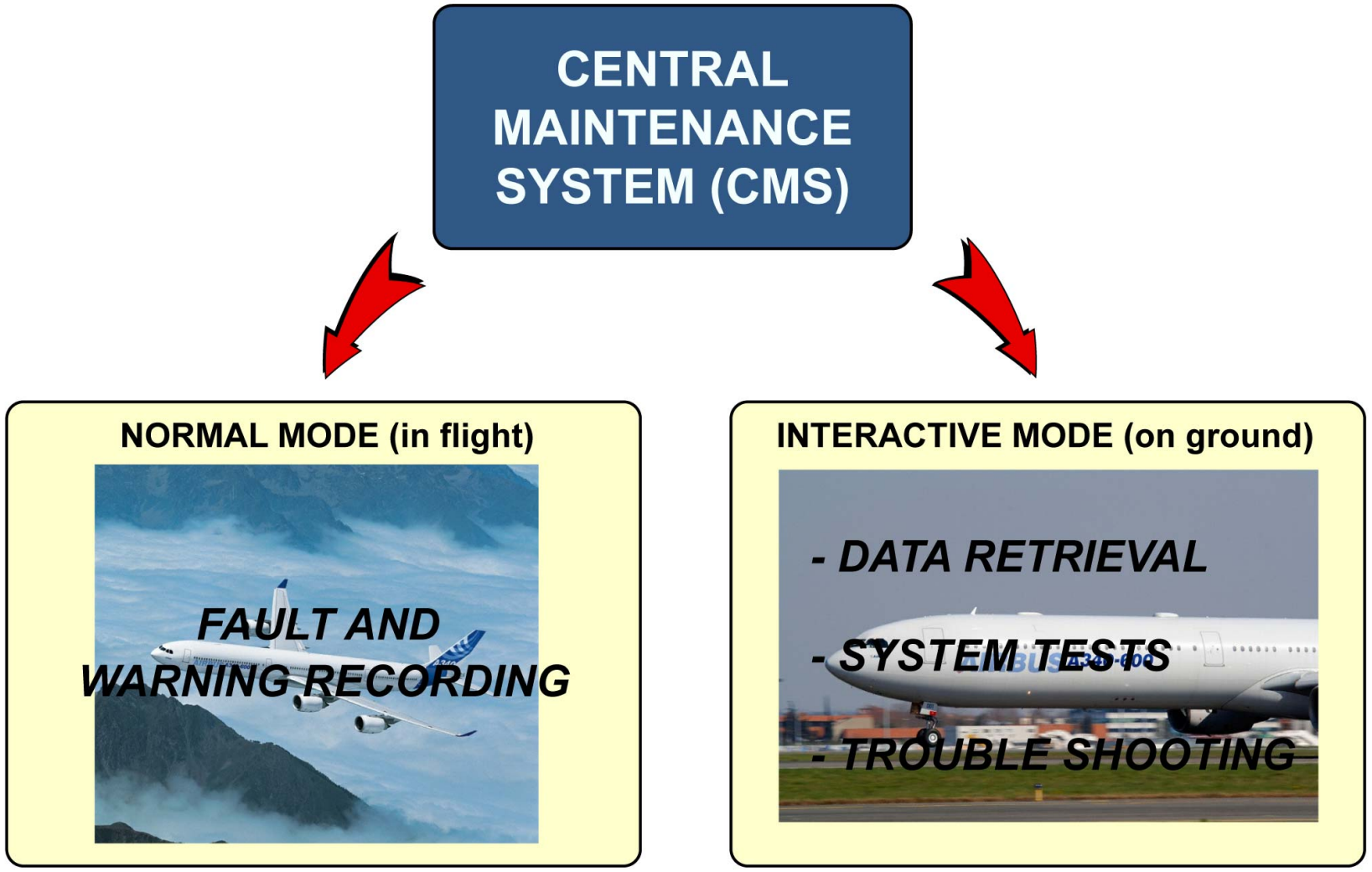
CENTRAL MAINTENANCE COMPUTER

CMS GENERAL DESCRIPTION (3)

OPERATION MODES

The CMS operates in two modes, a normal mode and an interactive mode. In normal mode, the CMS records fault messages from the system BITE and warnings from the FWCs. In interactive mode, which is available on the ground only, the CMS helps the operator to retrieve trouble-shooting data and to initiate tests.

G9409341 - GAUT0T0 - FM45DE000000002



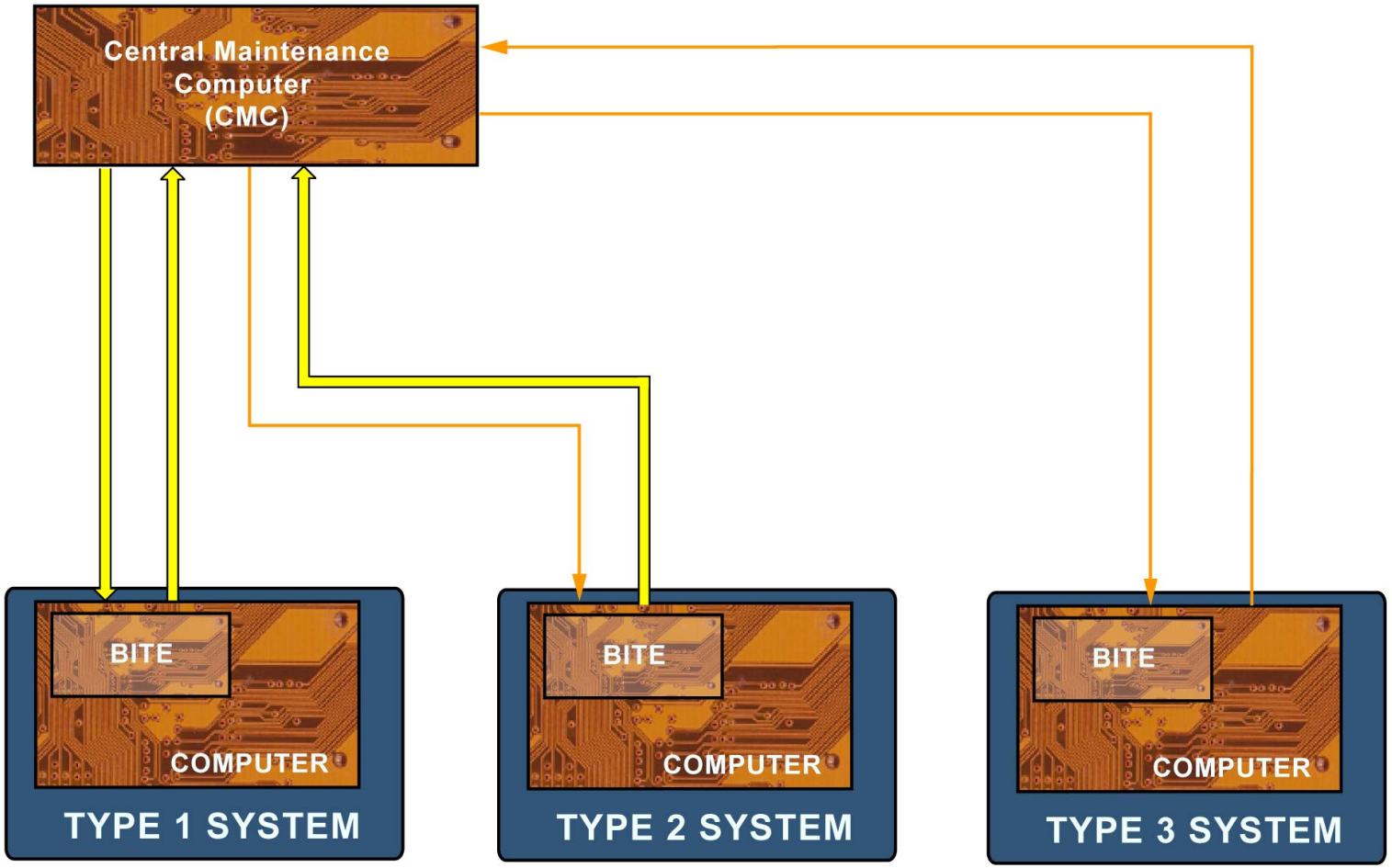
OPERATION MODES

CMS GENERAL DESCRIPTION (3)

SYSTEM TYPES

The systems are of three different types depending on their complexity. Most systems are type-1 systems. Type-1 systems can memorize failures that occurred during the last 64 flights. These systems are connected to the CMC by an ARINC 429 output bus and by an ARINC 429 input bus. This enables on-ground troubleshooting and interactive testing of the systems and their components.
The type-2 systems only memorize failures from the last flight. The output connection is an ARINC 429 bus. The system test signal is a discrete input. The Type-3 systems do not send failure messages. A discrete output indicates the system status. The test or the reset signal is a discrete input.

G9409341 - GAUT0T0 - FM45DE000000002



SYSTEM TYPES

CMS MESSAGE DESCRIPTION (3)

FAILURE CLASSES

Failures are divided into three classes depending on their operational and safety consequences on the A/C.

CLASS 1 FAILURES

Class 1 failures are the failures that have an operational consequence on the current flight. Some of them are displayed as a warning in real time on the ECAM and available on the MCDU.

CLASS 2 FAILURES

Class 2 failures are the failures that have no operational consequence on the current flight. Some affected systems are identified on the ECAM STATUS page. As for class 1 failures, the maintenance team can identify them on the post-flight report.

CLASS 3 FAILURES

Class 3 failures have neither operational nor safety consequences on the A/C. They are not indicated to the flight crew during flight. They are only available on ground through the MCDU class 3 report.

G9409341 - GAUT0T0 - FM45DF000000002

FAILURE / FAULT CLASSES	CLASS 1	CLASS 2	CLASS 3
OPERATIONAL CONSEQUENCES ON THE CURRENT FLIGHT	✓	✗	✗
INDICATION TO THE FLIGHT CREW	✓ - WARNING OR CAUTION MESSAGES ON EWD - FLAG ON PFD,ND OR SD - LOCAL WARNING	✓ AVAILABLE ON THE ECAM STATUS PAGE STS FLASHING AT THE END OF THE FLIGHT	✗
DISPATCH CONSEQUENCES	REFER TO MMEL : "GO", "GO IF", "NO GO"	"GO" CAN BE DIFFERED FOR 600 HOURS.	"GO" MMEL NOT APPLICABLE HOWEVER CORRECTION IS RECOMMENDED TO IMPROVE THE DISPATCH RELIABILITY
INDICATION TO THE MAINTENANCE TEAM	✓ FAULT MESSAGE ON THE CMCs POST FLIGHT REPORT		✓ AVAILABLE THROUGH CMC CLASS 3 REPORT ON REQUEST

FAILURE CLASSES - CLASS 1 FAILURES ... CLASS 3 FAILURES

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CMS MESSAGE DESCRIPTION (3)

INTERNAL / EXTERNAL FAILURES

Failure messages transmitted to the Central Maintenance Computer (CMC) can be internal or external.

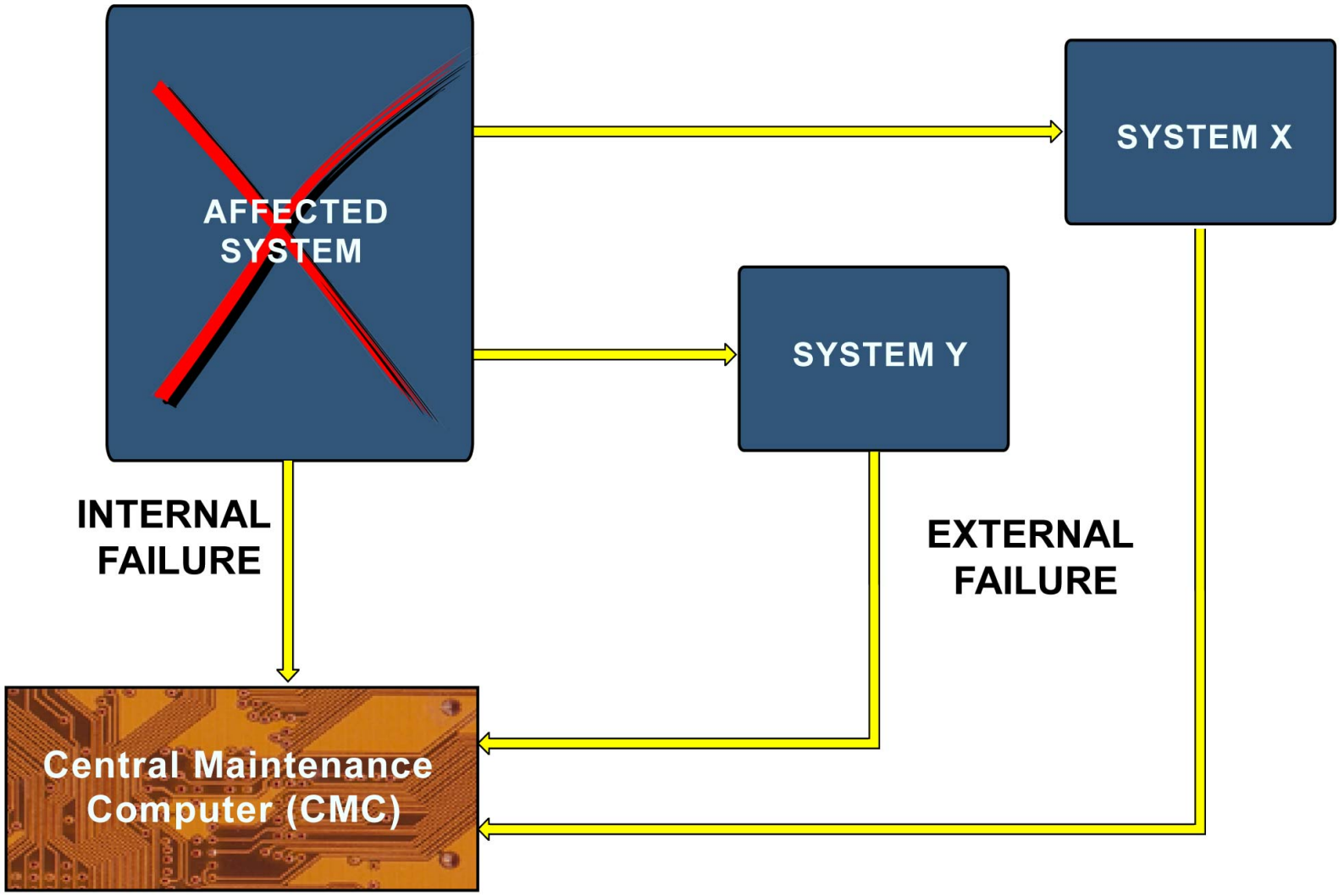
INTERNAL FAILURES

If a failure occurs within a system, the BITE will send an internal failure message to the CMC.

EXTERNAL FAILURES

The BITE of each system interfacing with the affected system will send an external failure message to the CMC.

G9409341 - GAUT0T0 - FM45DF000000002



INTERNAL / EXTERNAL FAILURES - INTERNAL FAILURES & EXTERNAL FAILURES

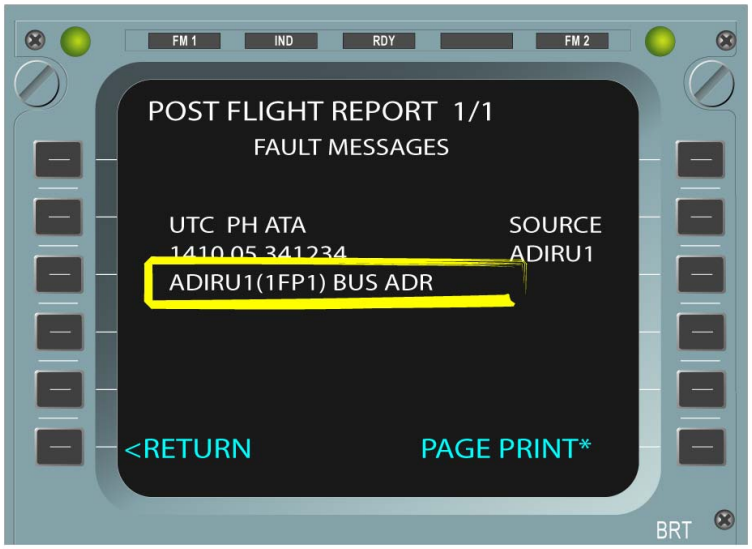
G9409341 - GAUT0T0 - FM45DF000000002

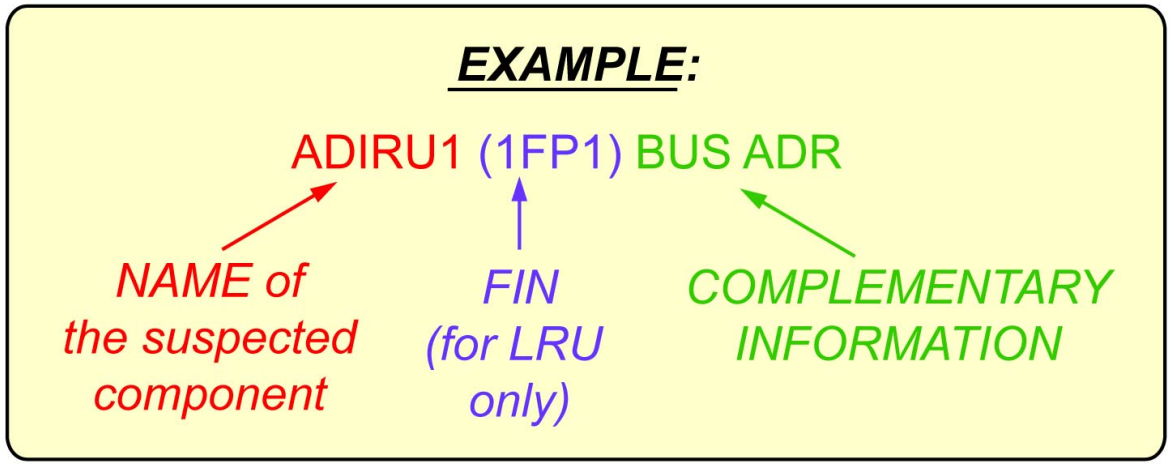
CMS MESSAGE DESCRIPTION (3)

FAILURE MESSAGES STRUCTURE

The maintenance messages are generated and memorized by the system BITE and transmitted to the CMC. These messages are all made up of one or several parts depending of the number of suspected Line Replaceable Units (LRUs) but only one suspected element is faulty. Each message is limited to a maximum of 48 characters in 2 lines of 24 characters. Each part of the maintenance message is composed in accordance with the syntax presented in the following figure.

G9409341 - GAUT0T0 - FM45DF000000002





FAILURE MESSAGES STRUCTURE

CMS MESSAGE DESCRIPTION (3)

MESSAGES DESCRIPTION

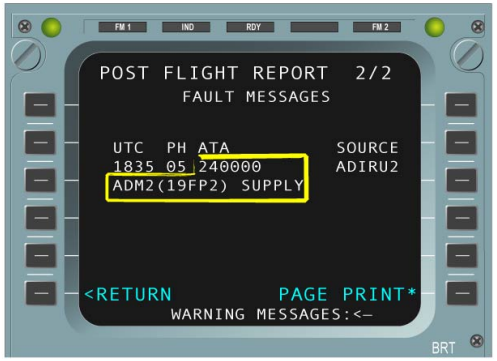
Any part is given in one of these five forms depending on the failure reported.
An "LRU (FIN)" message appears when:
- either the computer declares itself suspect,
- or a computer or a system receiving its signals declares the affected computer as suspect.

An "LRU (FIN) COMPLEMENTARY INFO" message appears when the suspected computer is generating several signals. The complementary information helps to identify the suspected signal and may be controlled on the A/C (signal, bus or discrete name). A "WRG: SIGNAL NAME" message appears when a wiring failure is identified (conclusion of the BITE analysis), with the name of the transmitted signal.
An "LRU (FIN) SPLY" message appears when an LRU supply loss is identified without ambiguity (the LRU itself may be one of the causes).
Specific messages are used for some faulty situations that would require too complex a BITE to identify the affected LRU. In these cases, only the operator can identify the faulty LRU. The procedure required is in the Trouble Shooting Manual (TSM).

G9409341 - GAUT0T0 - FM45DF000000002

LRU (FIN)

SPECIFIC MESSAGES



LRU (FIN) SPLY

LRU (FIN) COMPLEMENTARY INFO

WRG: SIGNAL NAME

MESSAGES DESCRIPTION

CMS MESSAGE DESCRIPTION (3)

AMBIGUOUS / MULTIPLE FAULTS MESSAGE CONSTRUCTION

In the case of ambiguous faults, up to three possible failures may be indicated in the most probable order. Each possibility being separated by a "/" sign, only one component is effectively responsible. In some cases of multiple faults, a BITE may generate a single maintenance message that concerns several defective components. A "+" sign separates the faulty components. The ATA reference next to the message corresponds to the first suspected component. When the FIN part of the message is absent, this means that no LRU is directly involved in this part. Each Central Maintenance System (CMS) message is covered by the TSM and is an entry point to trouble shooting.

G9409341 - GAUT0T0 - FM45DF000000002

AMBIGUOUS FAULTS

LRU1 (FIN) / LRU2 (FIN)

POSSIBILITY 1 (MOST PROBABLE) / POSSIBILITY 2 (LESS PROBABLE)

MULTIPLE FAULTS

LRU1 (FIN) + LRU1 (FIN)

FAULT 1 + FAULT 2

AMBIGUOUS / MULTIPLE FAULTS MESSAGE CONSTRUCTION

G9409341 - GAUT0T0 - FM45DF000000002

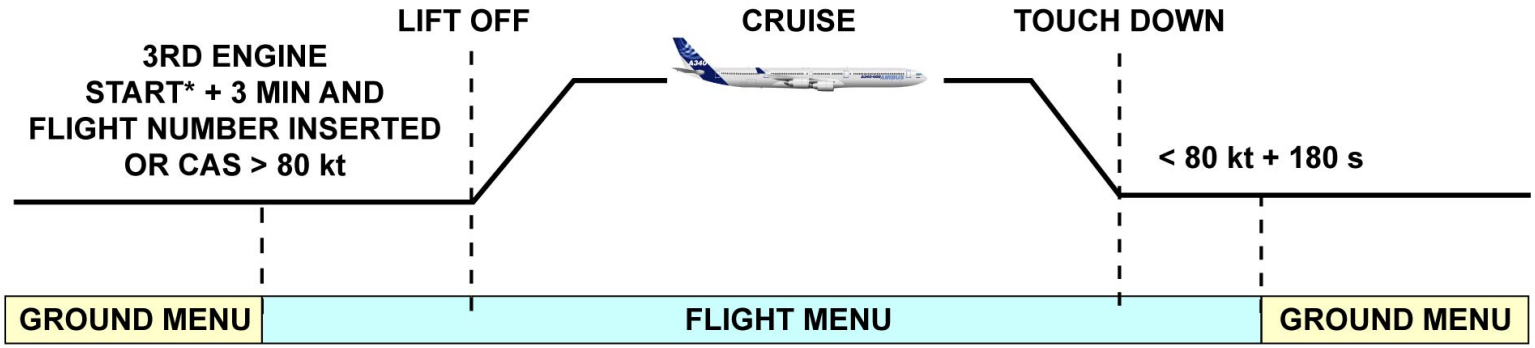
CMS MENUS DESCRIPTION (2)

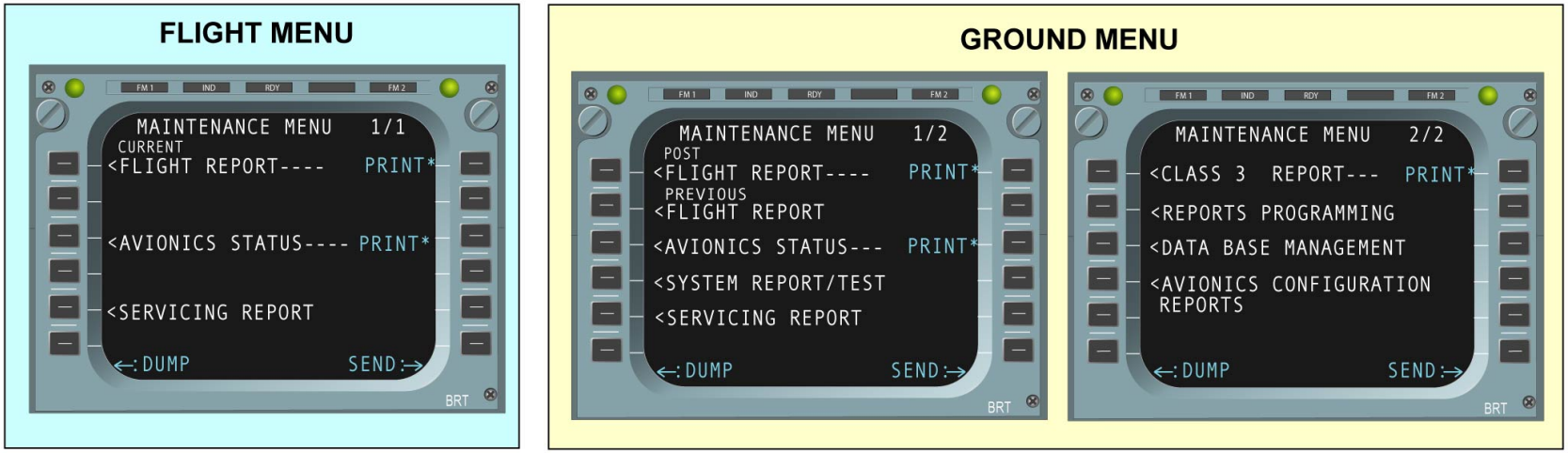
CMS MCDU FLT/GND MENUS

All the CMS functions are managed through the MCDUs. The functions are displayed on a ground menu and on a flight menu. The flight menu shows only a part of the ground menu. The Central Maintenance System (CMS) menu switches to flight mode, when at least 3 engines (one engine for the A330) are running for 180 seconds with the flight number inserted (or the aircraft speed is above 80 knots). The ground menu comes back during roll-out, when the aircraft speed is below 80 knots for more than 180 seconds.

G9409341 - GAUT0T0 - FM45DG000000002

*1ST ENGINE START FOR A330





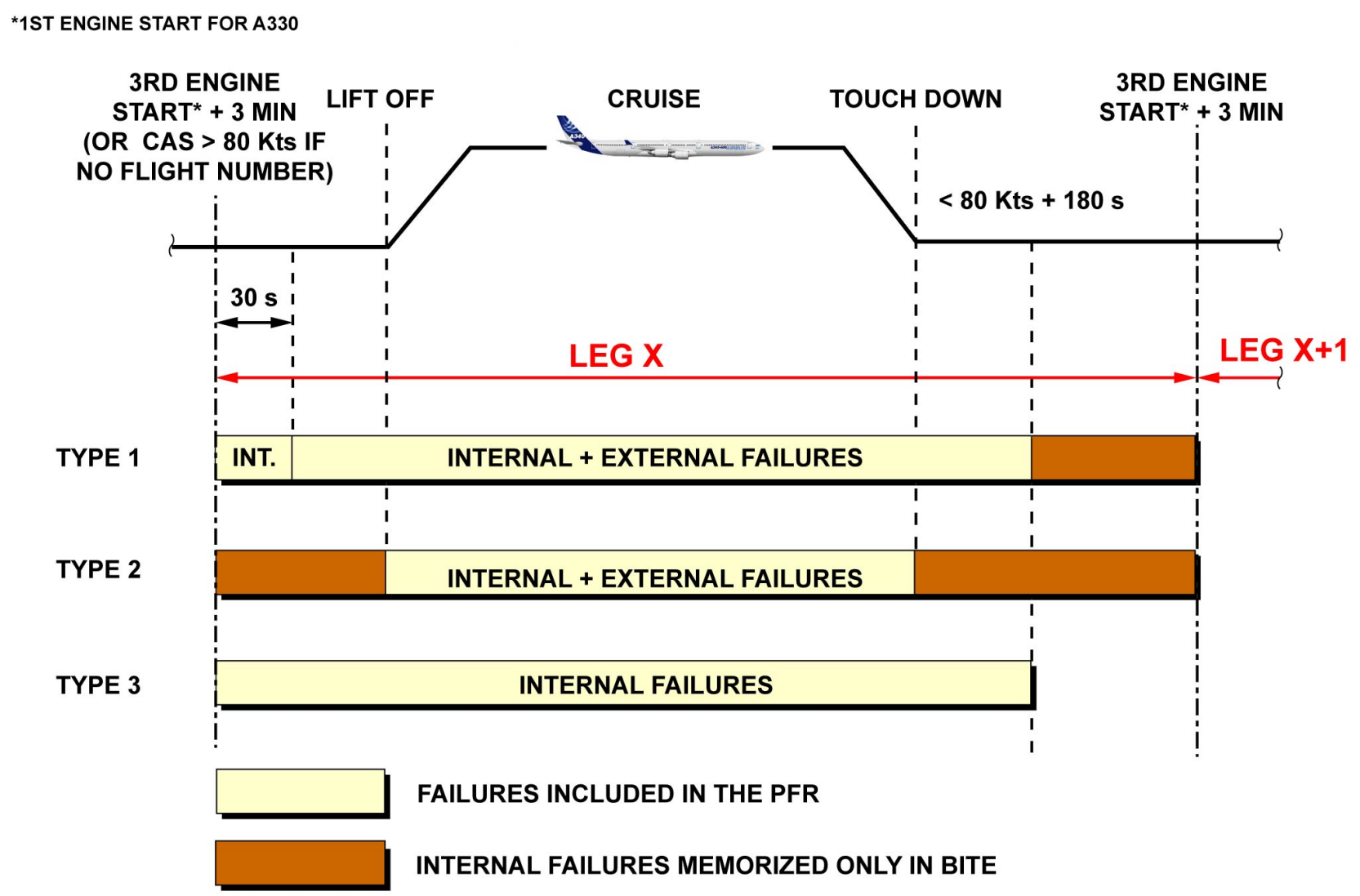
CMS MCDU FLT/GND MENUS

CMS MENUS DESCRIPTION (2)

NORMAL MODE

In normal mode, the Central Maintenance Computer (CMC) memorizes the fault messages from type 1 and type 2 systems and the fault status from type 3 systems. The three types of system have a different behavior depending on flight phases in the normal mode:
- type 1 systems receive CMC data for flight phase synchronization. They memorize failure messages at the start of each flight LEG until 80 knots +180s after touch down.
- type 2 systems only memorize failure messages when the aircraft is airborne (i.e. as soon as the landing gear is not compressed).
- type 3 systems transmit a permanent signal if they are faulty. In the normal mode, several functions give the aircraft status reports. The CURRENT FLIGHT REPORT function is available on the flight menu. It gives the list of Electronic Centralized Aircraft Monitoring (ECAM) warnings/cautions and faults related to class 1 and class 2 failures recorded during the current flight.
The POST FLIGHT REPORT function is available on the first page of the ground menu. It gives the list of ECAM warnings/cautions and faults related to class 1 and class 2 failures recorded during the last flight. The PREVIOUS FLIGHT REPORT function is available on the first page of the ground menu. It gives the list of the POST FLIGHT REPORTS over the last 63 previous flights.

G9409341 - GAUT0T0 - FM45DG000000002



NORMAL MODE

G9409341 - GAUT0T0 - FM45DG000000002

CMS MENUS DESCRIPTION (2)

INTERACTIVE MODE

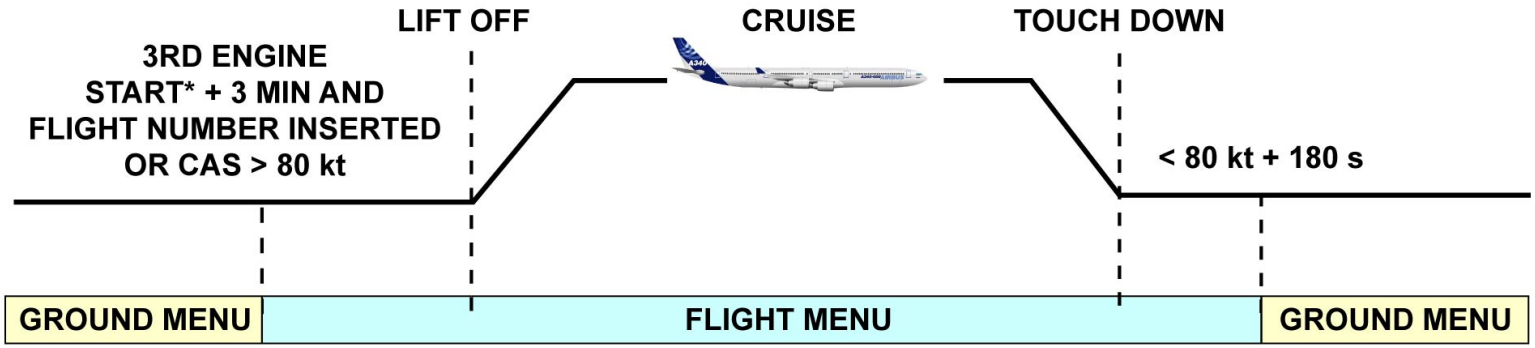
The SYSTEM REPORT/TEST function of the ground menu gives access to the interactive mode. In the interactive mode, which is available on the ground only, the CMS lets the operator retrieve troubleshooting data and to start system tests.

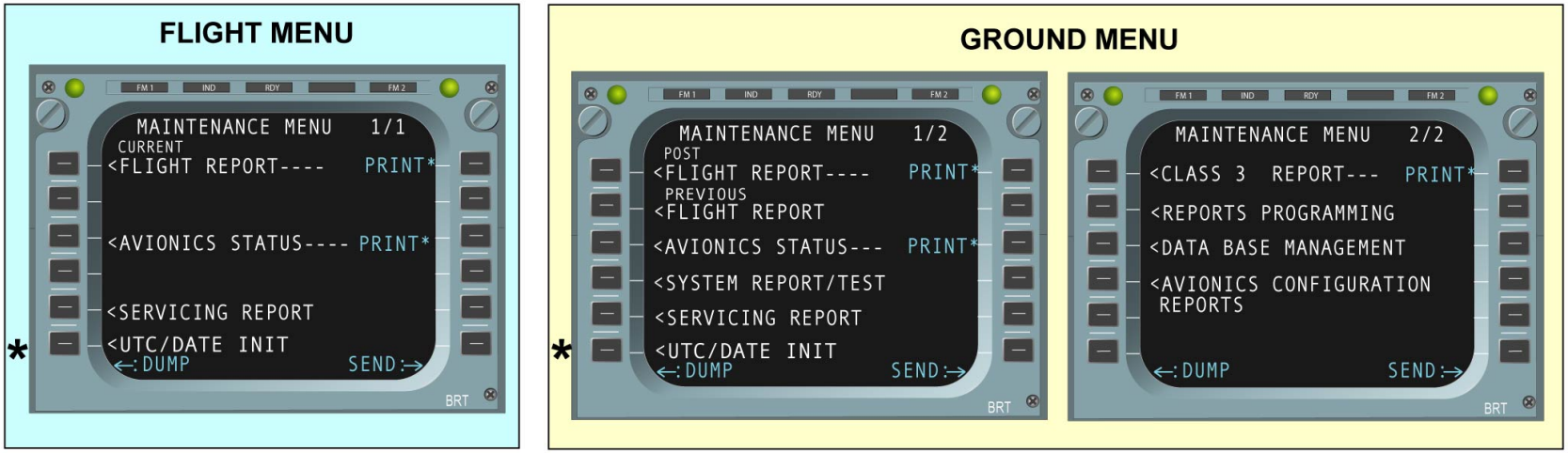
COMPLEMENTARY FUNCTIONS

Several complementary functions are available via the MCDU menus. The AVIONICS STATUS function is accessible on both flight and ground menus. It gives in real time a list of the systems affected by a fault. The CLASS 3 REPORT function is available on the second page of the ground menu. It gives the list of class 3 faults. The REPORTS PROGRAMMING function allows the automatic print, download or transmission of the PFR, SERVICING REPORT and CONFIG CHANGE REPORT, the activation of the FLIGHT REPORT FILTER.
The DATA BASE MANAGEMENT function allows the print or the transmission of maintenance filter data base, the avionics configuration database and the servicing report coupons. The AVIONICS CONFIGURATION REPORTS function manages the inventory of the aircraft computer part numbers and software diskettes. The SERVICING REPORT function gives reports with different parameters that have to be periodically checked and that may induce servicing actions. The UTC/DATE INIT function is accessible on both flight and ground menus. It appears after a long power interruption of the CMC. It enables initialization of the backup clock in case of main clock failure.

G9409341 - GAUT0T0 - FM45DG000000002

*1ST ENGINE START FOR A330





* <UTC/DATE INIT is only displayed after a long power interruption

INTERACTIVE MODE & COMPLEMENTARY FUNCTIONS

G9409341 - GAUT0T0 - FM45DG000000002

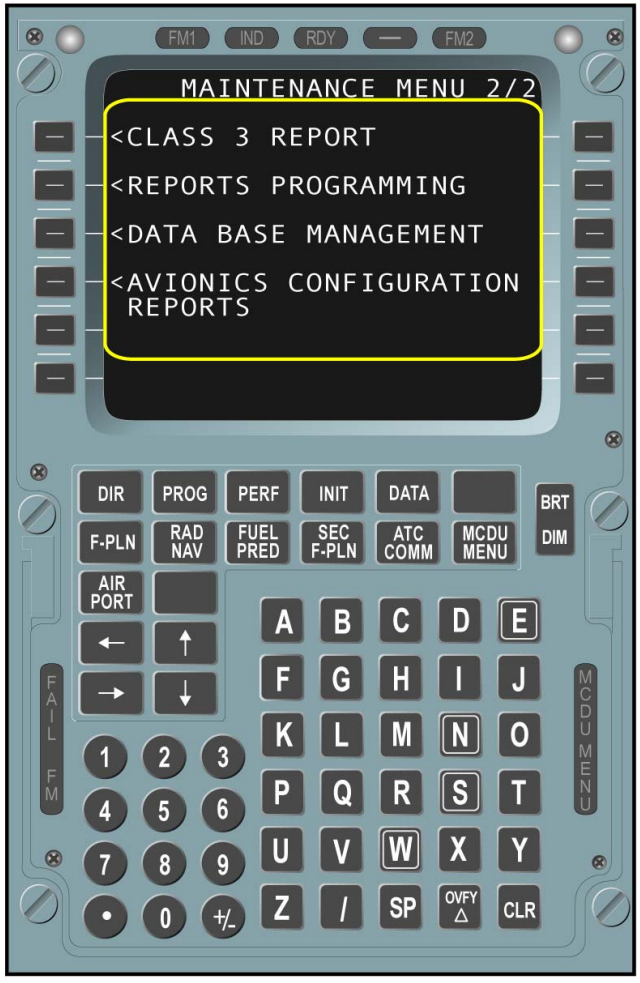
CMS OPERATION IN NORMAL MODE (2)

GENERAL

This is the MCDU menu page which presents the systems connected to the MCDU.
The Central Maintenance System (CMS) key allows access to the MAINTENANCE MENU. With the arrow key, all the normal mode CMS reports, can be shown.
These reports will be explained in the following topics, supposing the A/C on ground and engines shut down.

G9409341 - GAUT0T0 - FM45D1F45G60303

MCDU (100VU)



MCDU (100VU)

GENERAL

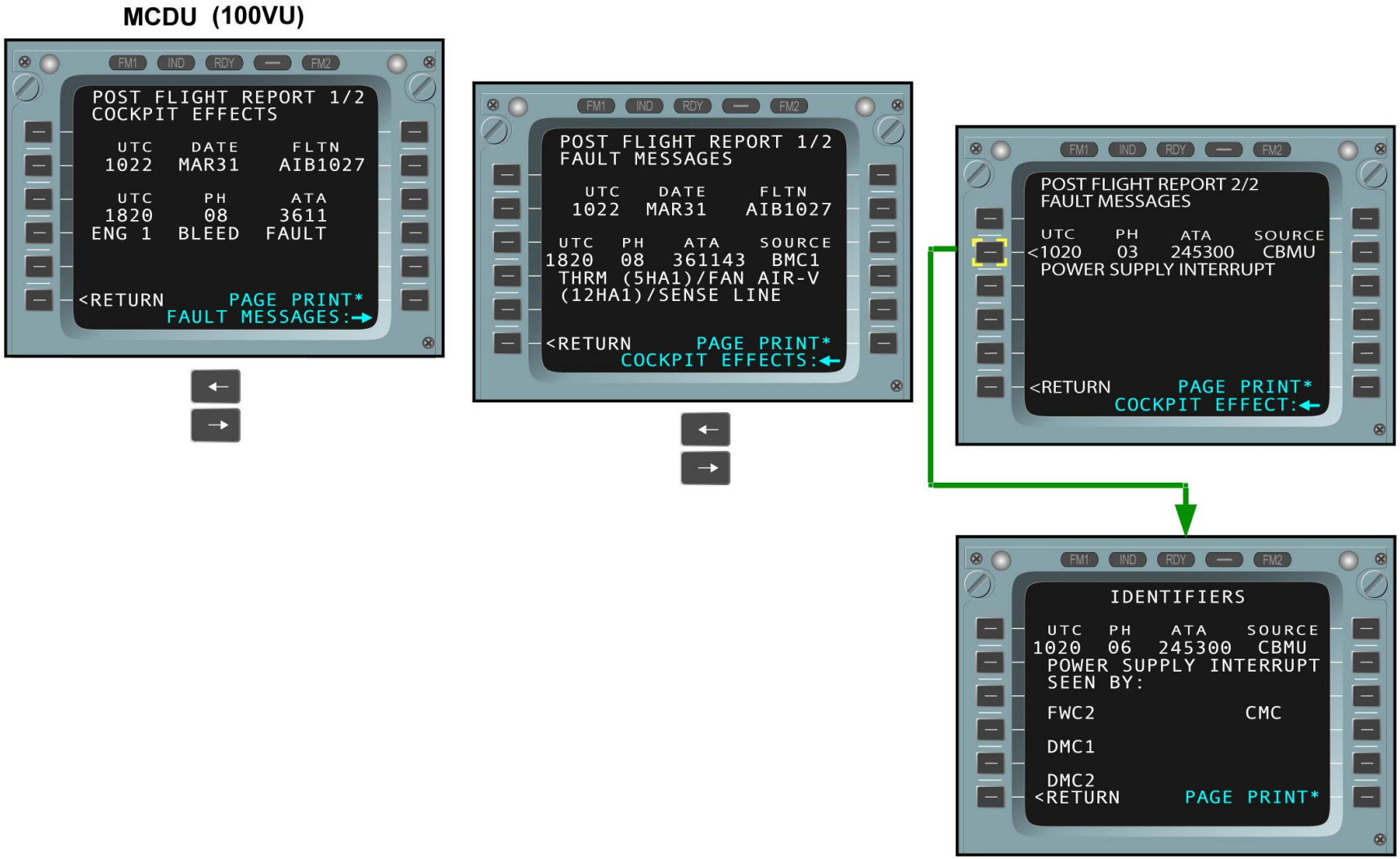
G94093341 - GAUT0T0 - FM45D1F45G60303

CMS OPERATION IN NORMAL MODE (2)

POST FLIGHT REPORT

The POST FLIGHT REPORT displays the ECAM messages such as WARNINGS/CAUTIONS and MAINTENANCE STATUS messages, and also CLASS 1 and 2 FAULT messages which occurred during the last flight and have been memorized in the Central Maintenance Computer (CMC). It can display a maximum of 64 warnings and 64 faults.
The first item of the POST FLIGHT REPORT are the ECAM messages. The first page contains only one of these messages. If there are several messages, they will be displayed 2 at a time only, on the following pages. In this example, there are 2 ECAM message pages.
The ECAM messages are displayed in the order of acquisition by the CMC, minute by minute. The last message memorized is displayed first. If there is no warning, the NO WARNING message will be displayed.
From each "warning messages" item page, we can access the first "fault messages" item page by pressing the right arrow key. The first page contains only one message. If there are several messages, they will be displayed 2 at a time only, on the following pages. In this example there are 2 fault message pages. The number of ECAM message item pages and FAULT message item pages is not necessarily the same.
The fault messages are displayed in the order of acquisition by the CMC, minute by minute. The last message memorized is displayed first. If there are no failures, the NO FAULT message will be displayed.
From each fault message item page, it is possible to go back to the first warning message item page by pressing the left arrow key.
In our example, the prompt (<) before the second fault message means that this fault is also detected by other systems as external failures. These systems are called IDENTIFIERS. The IDENTIFIERS page lists the fault message and the name of the systems, other than the source, which detected the fault. A maximum of 6 systems can be displayed.
This screen shows a summary of the main pages of the MCDU described in the topic.

G9409341 - GAUT0T0 - FM45D1F45G60303



POST FLIGHT REPORT

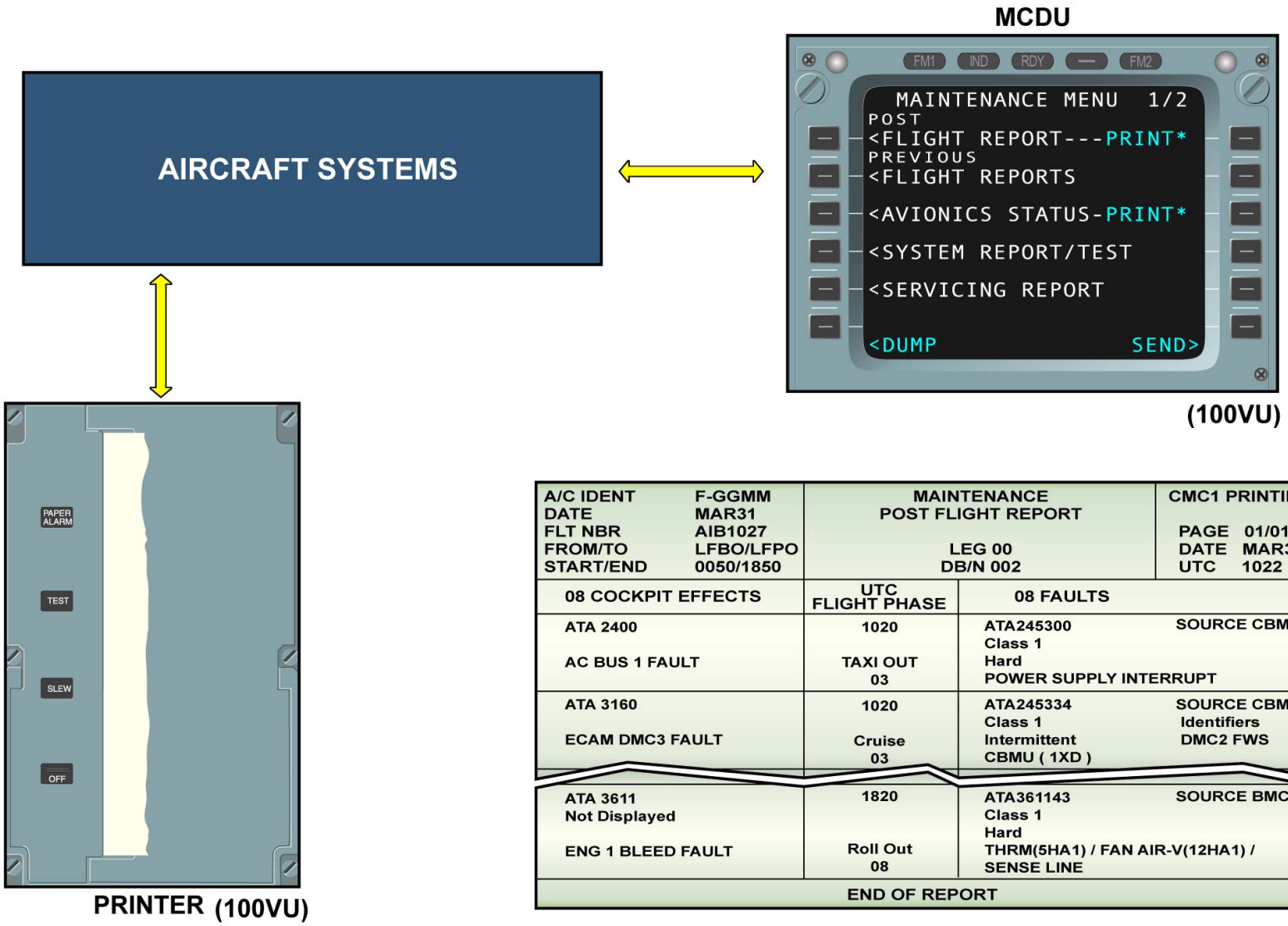
G9409341 - GAUT0T0 - FM45D1F45G60303

CMS OPERATION IN NORMAL MODE (2)

POST FLIGHT REPORT PRINT

All the information presented on the POST FLIGHT REPORT on different MCDU screens is printed together on one page. Extra information is added in this POST FLIGHT REPORT print-out. In flight, this report is called the CURRENT FLIGHT REPORT. It can be printed at any time.
The ECAM and FAULT messages concerning the same event and recorded in the same minute are printed side by side.
The header presents general information about the flight and the report print-out.
The cockpit effects list presents the ECAM messages. If a warning is generated during a flight phase inhibit, it will not be presented to the crew. On the post flight report cockpit effects, the warning will be presented and "NOT DISPLAYED" added to the message.
The time of warning or fault message occurrence and the name of the flight phase are displayed.
The FAULTS list presents intermittent failures and permanent failures called hard failures with their source and their identifiers.

G9409341 - GAUT0T0 - FM45D1F45G60303



A/C IDENT F-GGMM DATE MAR31 FLT NBR AIB1027 FROM/TO LFBO/LFPO START/END 0050/1850	MAINTENANCE POST FLIGHT REPORT LEG 00 DB/N 002	CMC1 PRINTING PAGE 01/01 DATE MAR31 UTC 1022
08 COCKPIT EFFECTS	UTC FLIGHT PHASE	08 FAULTS
ATA 2400 AC BUS 1 FAULT	1020 TAXI OUT 03	ATA245300 SOURCE CBMU Class 1 Hard POWER SUPPLY INTERRUPT
ATA 3160 ECAM DMC3 FAULT	1020 Cruise 03	ATA245334 SOURCE CBMU Class 1 Identifiers Intermittent DMC2 FWS CBMU (1XD)
ATA 3611 Not Displayed ENG 1 BLEED FAULT	1820 Roll Out 08	ATA361143 SOURCE BMC1 Class 1 Hard THRM(5HA1) / FAN AIR-V(12HA1) / SENSE LINE
END OF REPORT		

POST FLIGHT REPORT PRINT

G9409341 - GAUT0T0 - FM45D1F45G60303

CMS OPERATION IN NORMAL MODE (2)

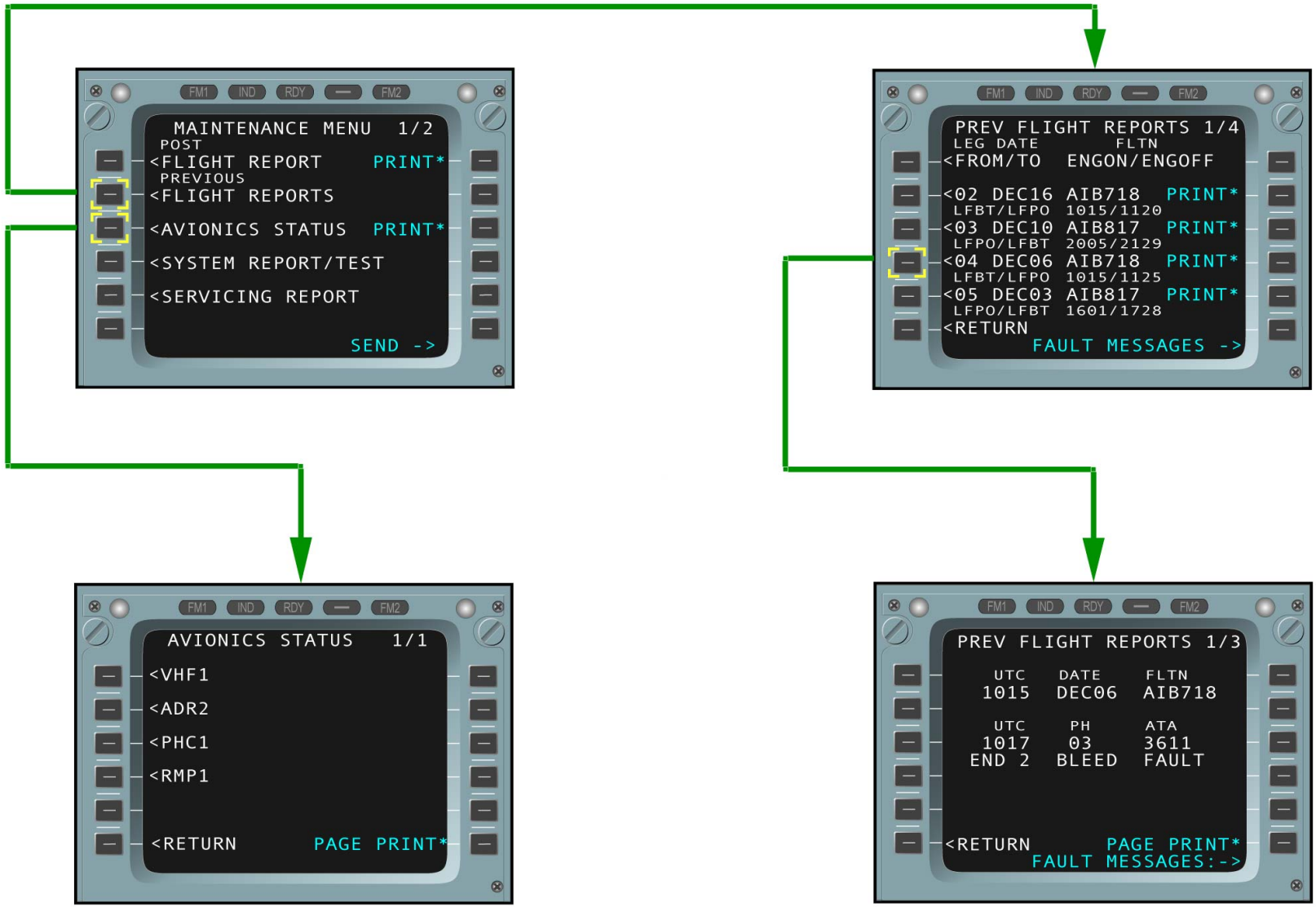
PREVIOUS FLIGHT REPORTS

The PREVIOUS FLIGHT REPORTS item gives access to the PREVious FLIGHT REPORTS affected by failures, with a maximum of 63 previous flights. It will display a maximum of 256 warning and fault messages.
This report presents the list of the previous flights, 4 per page, and allows access to the corresponding PREVious FLIGHT REPORTS. The flights are presented in reverse order on the MCDU screen. To study the details of these reports, please refer to the POST FLIGHT REPORT topic.
In case of CMC removal/installation, if the new CMC comes from another A/C, the PREVious FLIGHT REPORTS concerning this A/C will not be displayed.
If the new CMC comes from the shop, a pseudo flight (00) is created to indicate the date of the first computer installation on the aircraft.

AVIONICS STATUS

In flight or on ground, the AVIONICS STATUS report displays the identity of systems affected by at least one CLASS 1 or 2 internal or external failure at the moment of request. The entire report can be printed.
This is the list of systems affected by a failure. If no systems are affected, the NO FAULT message is displayed.
On ground, a prompt (<) indicates that a direct access to interactive mode of the selected system is possible. If the SYSTEM REPORT/TEST mode is selected on one of the other MCDUs, the "DUAL SYSTEM ACCESS" message is displayed on the scratchpad line.
This screen shows a summary of the main pages of the MCDU described in the topic.

G9409341 - GAUT0T0 - FM45D1F45G60303



PREVIOUS FLIGHT REPORTS & AVIONICS STATUS

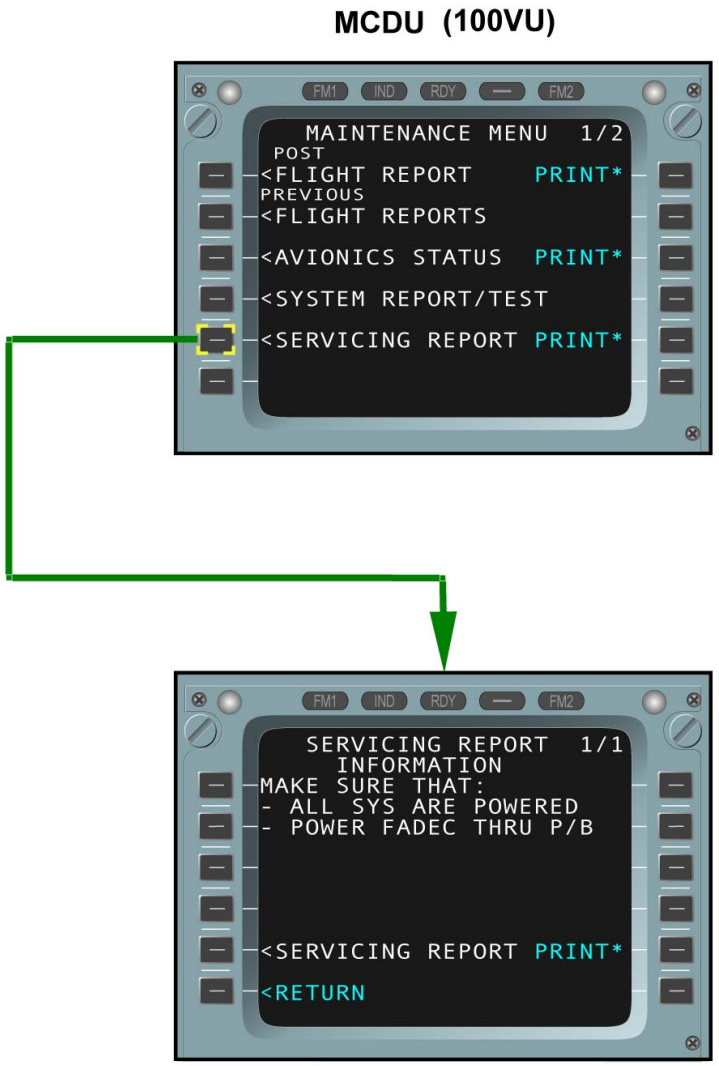
G9409341 - GAUT0T0 - FM45D1F45G60303

CMS OPERATION IN NORMAL MODE (2)

SERVICING REPORTS

The SERVICING REPORT function provides, in flight or on ground, reports of different parameters which have to be periodically checked and which may induce servicing actions. The SERVICING REPORT is accessible through the MCDU, it can be also printed or dumped (MDDU) or transmitted to the ground (ATSU).

G9409341 - GAUT0T0 - FM45D1F45G60303



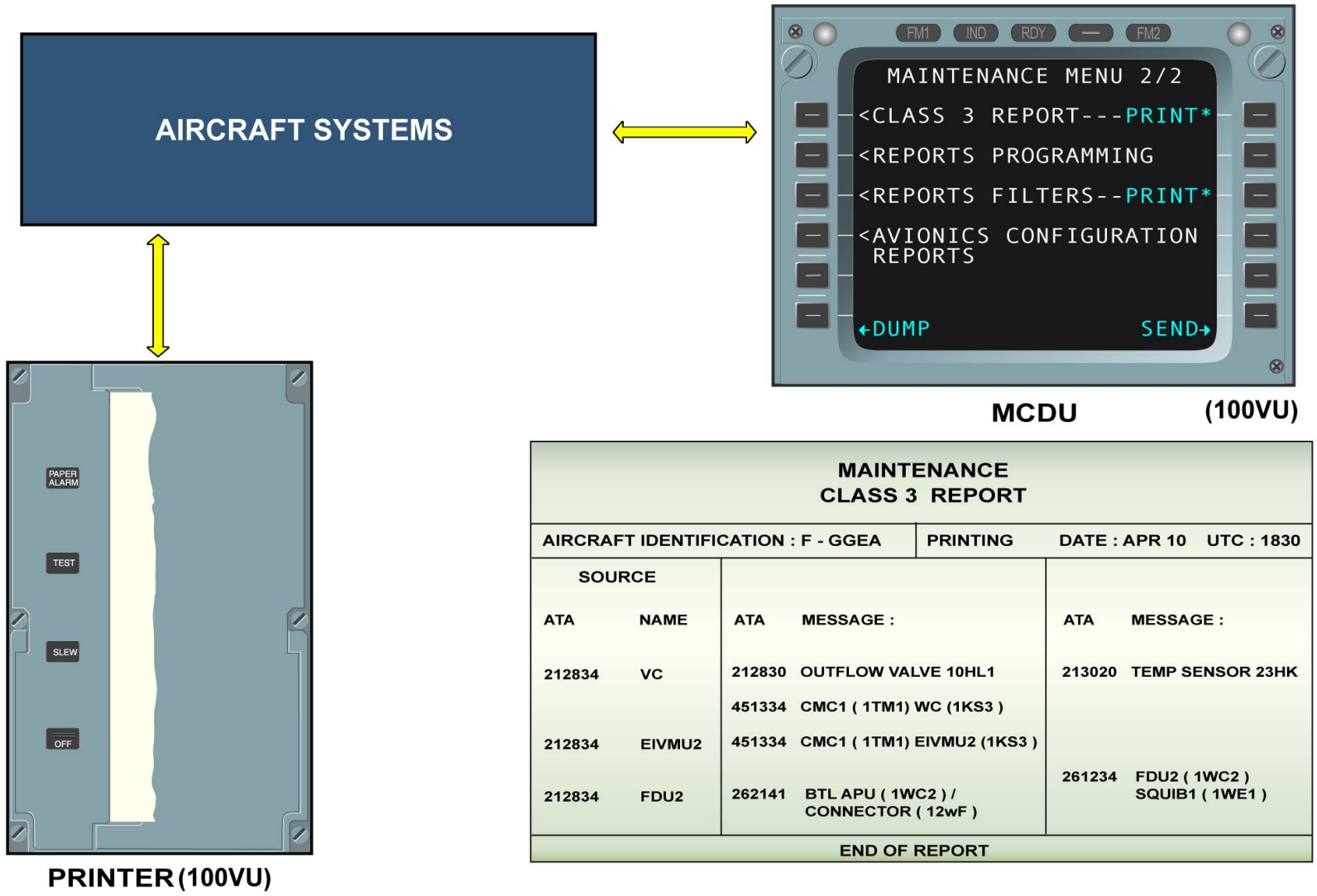
SERVICING REPORTS

CMS OPERATION IN NORMAL MODE (2)

CLASS 3 REPORT

This report displays the list of systems affected by class 3 faults and the failures by system on request. This report is created, on ground only, by the CMC upon selection.
A page tells the operator to check that all systems are in normal configuration and enables the CLASS 3 REPORT to be printed. The affected systems list is shown on the MCDU.
Select the corresponding adjacent line key, to see the list of the class 3 failures sent to the CMC by a computer.
If there are no failures, the NO FAULT message will be displayed.
In the complete CLASS 3 REPORT print out, class 3 failures and affected systems are printed side by side. The header presents general information about the A/C identification and the report printout. A list presents the systems affected by at least one CLASS 3 fault. A list presents the associated CLASS 3 fault messages.

G9409341 - GAUT0T0 - FM45D1F45G60303



MAINTENANCE
CLASS 3 REPORT

AIRCRAFT IDENTIFICATION : F - GGEA | PRINTING | DATE : APR 10 | UTC : 1830

SOURCE					
ATA	NAME	ATA	MESSAGE :	ATA	MESSAGE :
212834	VC	212830	OUTFLOW VALVE 10HL1	213020	TEMP SENSOR 23HK
		451334	CMC1 (1TM1) WC (1KS3)		
212834	EIVMU2	451334	CMC1 (1TM1) EIVMU2 (1KS3)		
212834	FDU2	262141	BTL APU (1WC2) / CONNECTOR (12wF)	261234	FDU2 (1WC2) SQUIB1 (1WE1)

END OF REPORT

CLASS 3 REPORT

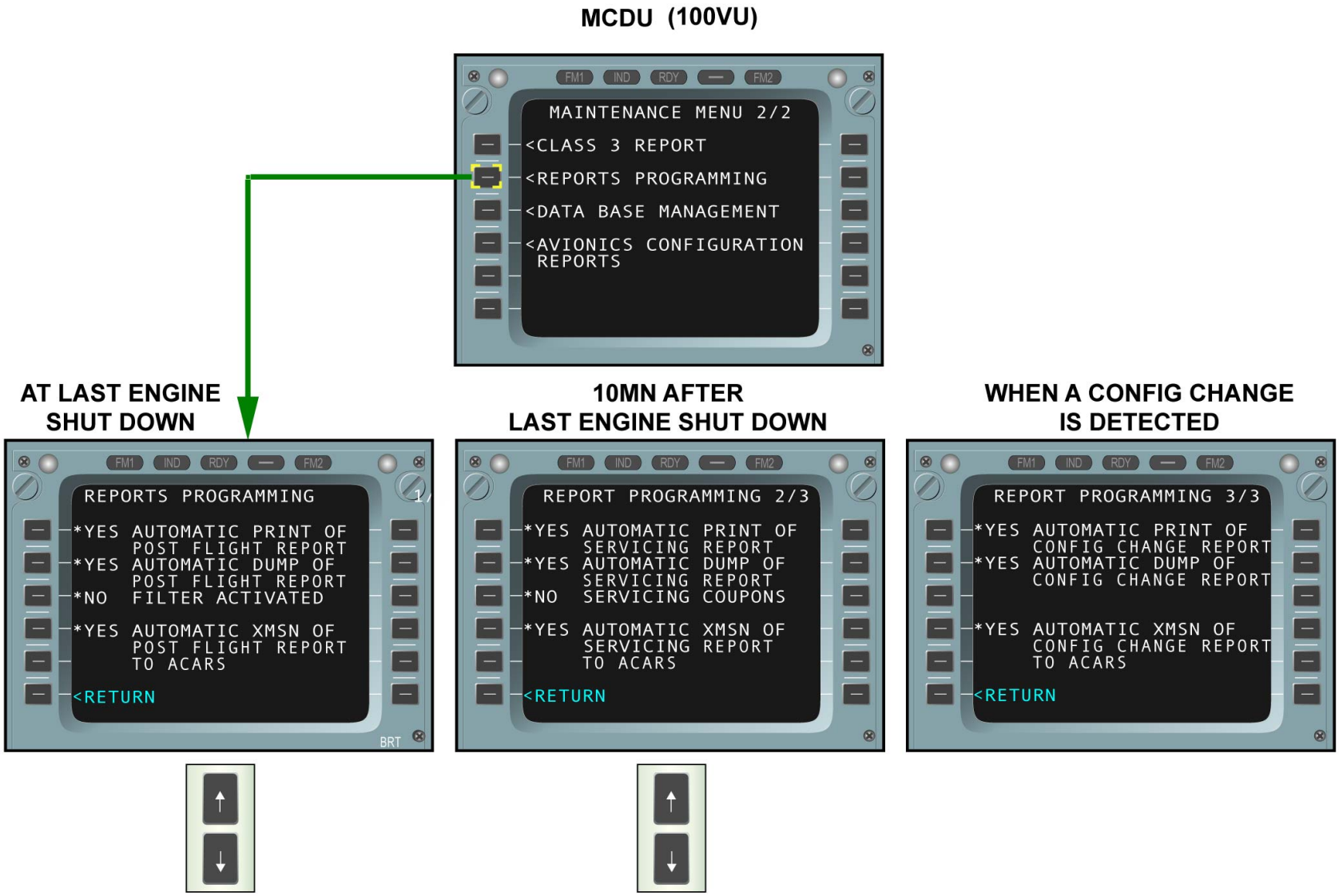
CMS OPERATION IN NORMAL MODE (2)

REPORTS PROGRAMMING

Filtering and reports programming functions are available via the second page of the maintenance menu.
The purpose of this function is to program (YES or NO), via the MCDU, the:
- automatic transmission of PFR, SERVICING REPORT, CONFIG CHANGE REPORT (print, send or dump),
- activation of the FLIGHT REPORT FILTER,
- triggering and processing of SERVICING REPORT.

The report filter allows the spurious messages filtering in the PFR. The filter can be programmed at engineering level.

G9409341 - GAUT0T0 - FM45D1F45G60303


MCDU (100VU)
FM1 IND RDY FM2
MAINTENANCE MENU 2/2
<CLASS 3 REPORT
<REPORTS PROGRAMMING
<DATA BASE MANAGEMENT
<AVIONICS CONFIGURATION REPORTS
AT LAST ENGINE SHUT DOWN
10MN AFTER LAST ENGINE SHUT DOWN
WHEN A CONFIG CHANGE IS DETECTED
REPORTS PROGRAMMING
*YES AUTOMATIC PRINT OF POST FLIGHT REPORT
*YES AUTOMATIC DUMP OF POST FLIGHT REPORT
*NO FILTER ACTIVATED
*YES AUTOMATIC XMSN OF POST FLIGHT REPORT TO ACARS
<RETURN
BRT
REPORT PROGRAMMING 2/3
*YES AUTOMATIC PRINT OF SERVICING REPORT
*YES AUTOMATIC DUMP OF SERVICING REPORT
*NO SERVICING COUPONS
*YES AUTOMATIC XMSN OF SERVICING REPORT TO ACARS
<RETURN
REPORT PROGRAMMING 3/3
*YES AUTOMATIC PRINT OF CONFIG CHANGE REPORT
*YES AUTOMATIC DUMP OF CONFIG CHANGE REPORT
*YES AUTOMATIC XMSN OF CONFIG CHANGE REPORT TO ACARS
<RETURN

REPORTS PROGRAMMING

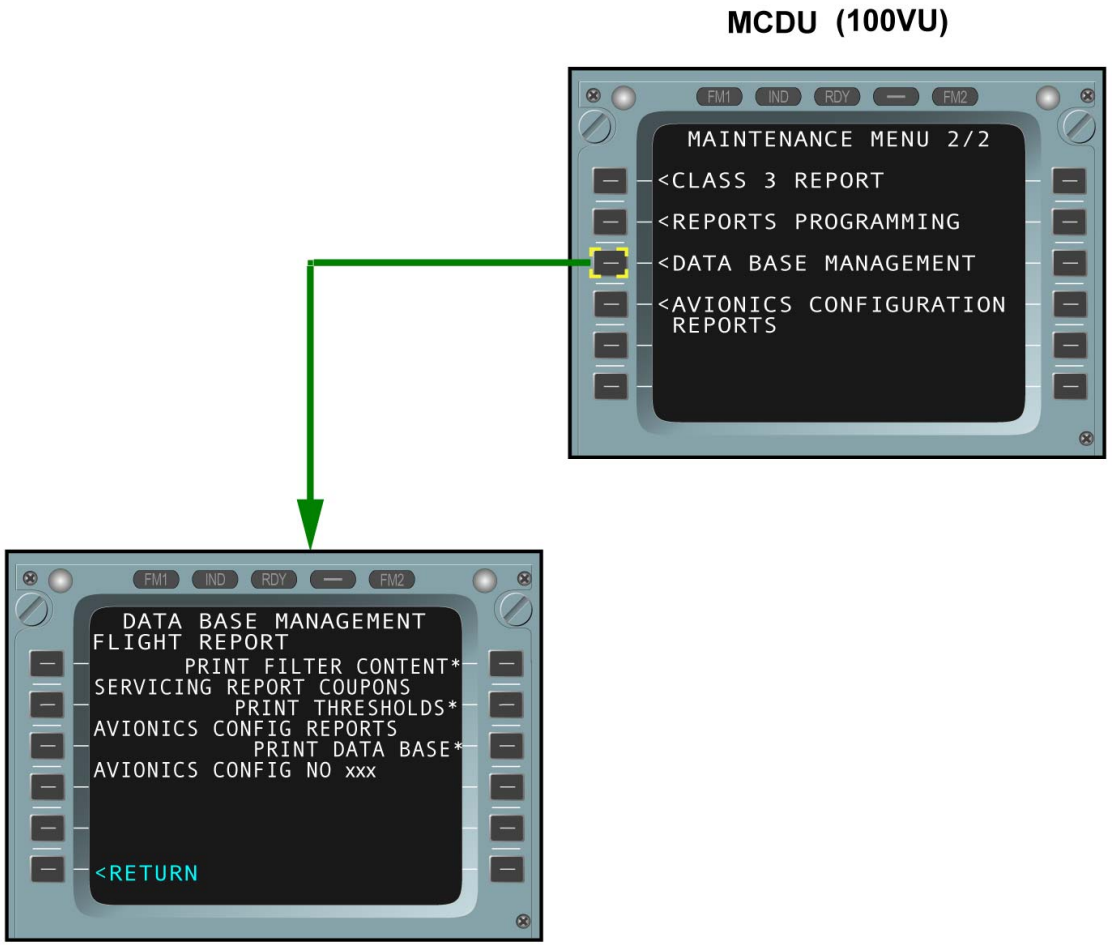
G94093341 - GAUT0T0 - FM45D1F45G60303

CMS OPERATION IN NORMAL MODE (2)

DATA BASE MANAGEMENT

The purpose of this function is to:
- print the contents of the maintenance filter data base,
- print the contents of the servicing reports and avionics configuration data base.

G9409341 - GAUT0T0 - FM45D1F45G60303



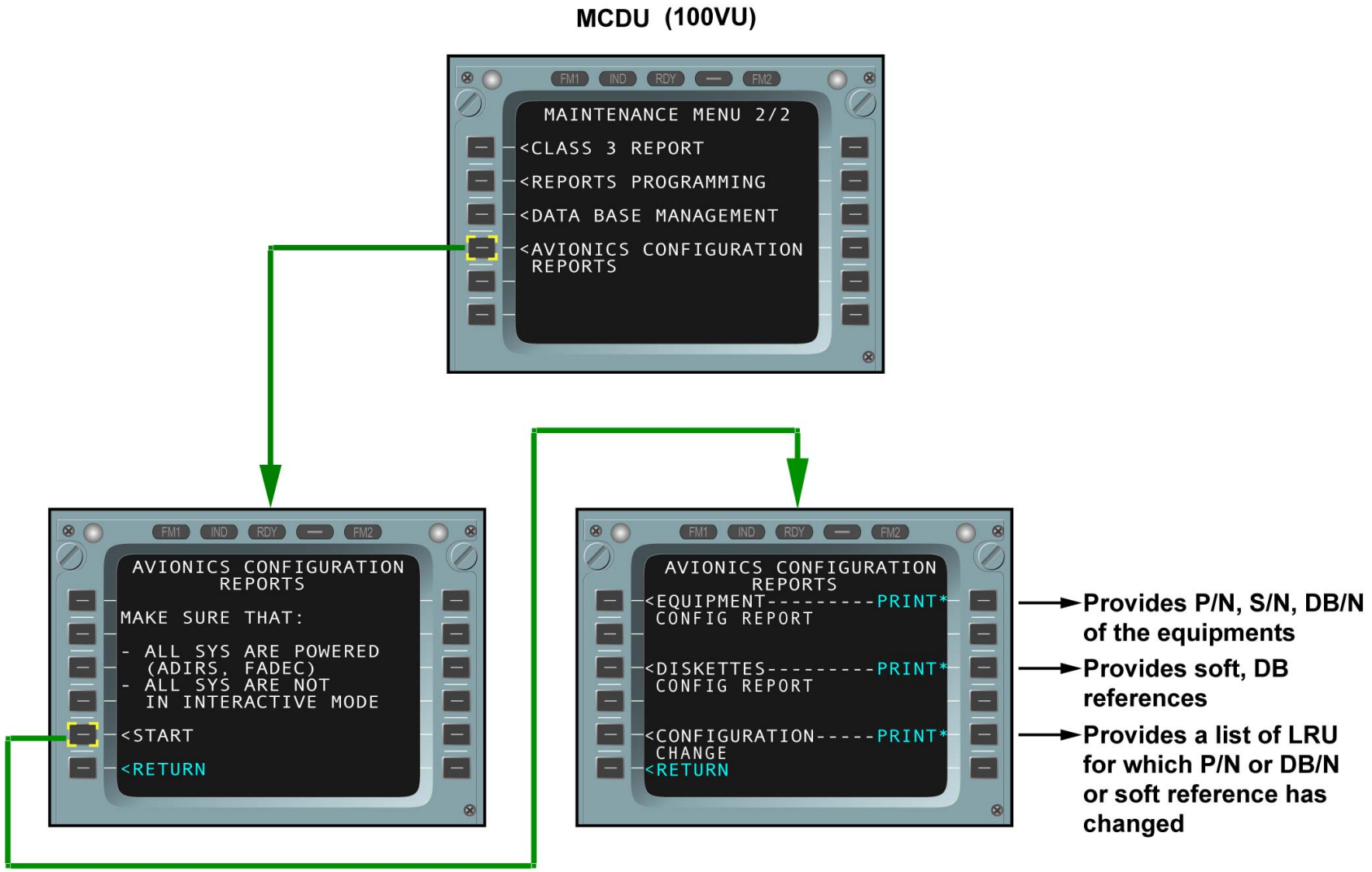
DATA BASE MANAGEMENT

CMS OPERATION IN NORMAL MODE (2)

AVIONICS CONFIGURATION REPORTS

The purpose of this function is to present, on ground only, a compilation of configuration information (LRU IDENTIFICATION in each system BITE menu).

G9409341 - GAUT0T0 - FM45D1F45G60303



AVIONICS CONFIGURATION REPORTS

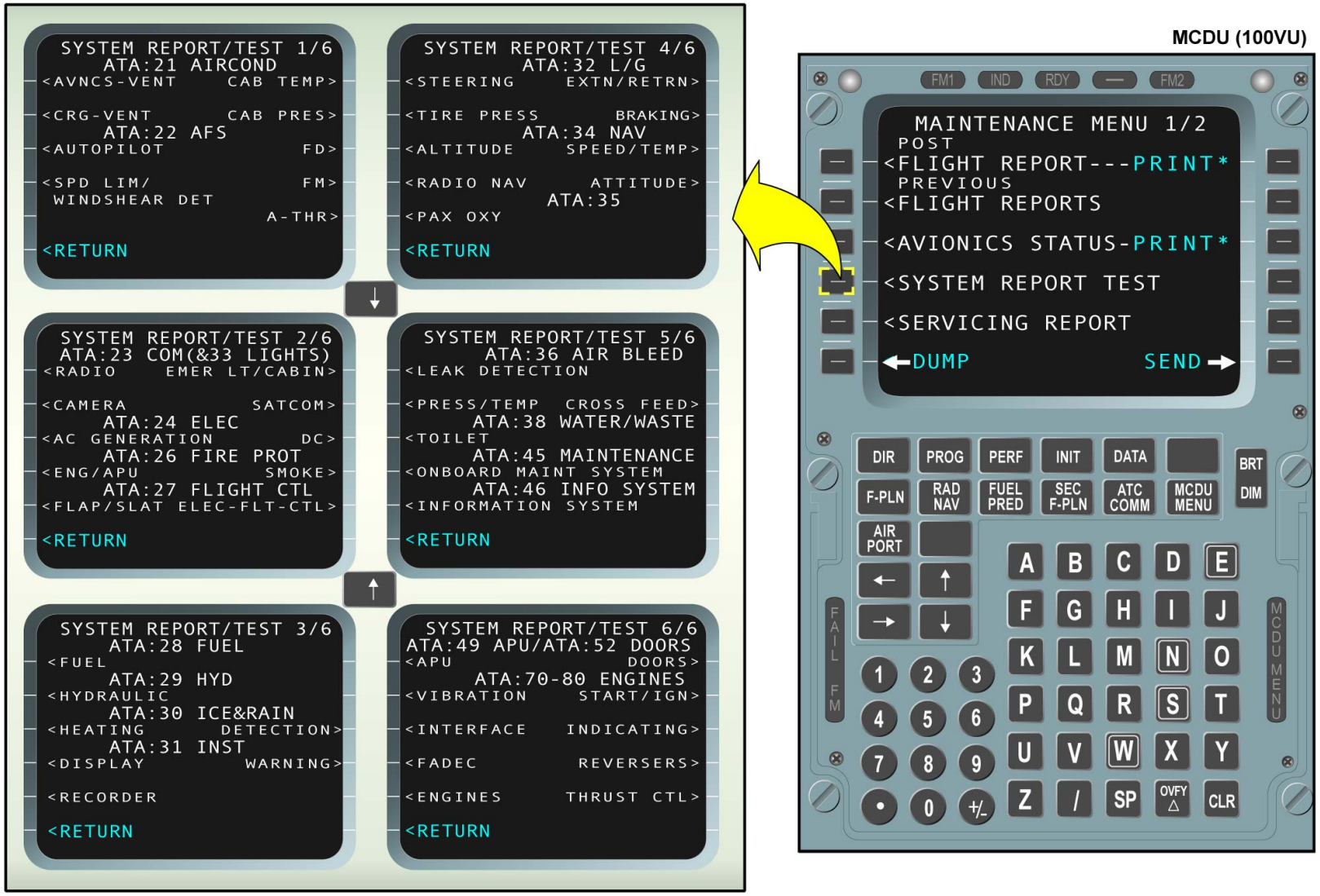
G94093341 - GAUT0T0 - FM45D1F45G60303

CMS OPERATION IN INTERACTIVE MODE (2)

GENERAL

This module is developed on the basis that the A/C is on ground and engines shut down. From the first page of the MCDU maintenance menu, access to the interactive mode through the system report/test function is gained. This function ensures the dialog between the MCDUs and each system, type 1, 2, or 3, connected to the Central Maintenance Computer (CMC), on ground only two MCDU's may be used at the same time. The page displayed by the CMC gives the list of all the systems sorted by function in the ATA chapter sequence. This list is displayed on 6 pages, which are shown in the following figures. Each function allows access to the related computers or units dealing with that function.

G9409341 - GAUT0T0 - FM45D2F45C70603


SYSTEM REPORT/TEST 1/6
ATA:21 AIRCOND
<AVNCS-VENT CAB TEMP>
<CRG-VENT CAB PRES>
ATA:22 AFS
<AUTOPILOT FD>
<SPD LIM/ FM>
WINDSHEAR DET
A-THR>
<RETURN
SYSTEM REPORT/TEST 4/6
ATA:32 L/G
<STEERING EXTN/RETRN>
<TIRE PRESS BRAKING>
ATA:34 NAV
<ALTITUDE SPEED/TEMP>
<RADIO NAV ATTITUDE>
ATA:35
<PAX OXY
<RETURN
SYSTEM REPORT/TEST 2/6
ATA:23 COM(&33 LIGHTS)
<RADIO EMER LT/CABIN>
<CAMERA SATCOM>
ATA:24 ELEC
<AC GENERATION DC>
ATA:26 FIRE PROT
<ENG/APU SMOKE>
ATA:27 FLIGHT CTL
<FLAP/SLAT ELEC-FLT-CTL>
<RETURN
SYSTEM REPORT/TEST 5/6
ATA:36 AIR BLEED
<LEAK DETECTION
<PRESS/TEMP CROSS FEED>
ATA:38 WATER/WASTE
<TOILET
ATA:45 MAINTENANCE
<ONBOARD MAINT SYSTEM
ATA:46 INFO SYSTEM
<INFORMATION SYSTEM
<RETURN
SYSTEM REPORT/TEST 3/6
ATA:28 FUEL
<FUEL
ATA:29 HYD
<HYDRAULIC
ATA:30 ICE&RAIN
<HEATING DETECTION>
ATA:31 INST
<DISPLAY WARNING>
<RECORDER
<RETURN
SYSTEM REPORT/TEST 6/6
ATA:49 APU/ATA:52 DOORS
<APU DOORS>
ATA:70-80 ENGINES
<VIBRATION START/IGN>
<INTERFACE INDICATING>
<FADEC REVERSERS>
<ENGINES THRUST CTL>
<RETURN
MCDU (100VU)
FM1
IND
RDY
FM2
MAINTENANCE MENU 1/2
POST
<FLIGHT REPORT---PRINT*
PREVIOUS
<FLIGHT REPORTS
<AVIONICS STATUS-PRINT*
<SYSTEM REPORT TEST
<SERVICING REPORT
←DUMP
SEND→
DIR
PROG
PERF
INIT
DATA
BRT
DIM
F-PLN
RAD NAV
FUEL PRED
SEC F-PLN
ATC COMM
MCDU MENU
AIR PORT
FAIL FM
MCDU MENU
A B C D E
F G H I J
K L M N O
P Q R S T
U V W X Y
Z / SP OVFY △ CLR
1 2 3
4 5 6
7 8 9
• 0 +/-

GENERAL

CMS OPERATION IN INTERACTIVE MODE (2)

TYPE 1 SYSTEM TYPICAL MENU

This is a typical type 1 system menu. However, most of the radio navigation, navigation and communication systems, which are interchangeable with other A/C, may have a different menu presentation. The following items shown in the table are always available.

LAST LEG REPORT

The purpose of this item is to present the internal and external class 1 and 2 fault messages, concerning the system, that appeared during the last flight.

PREVIOUS LEGS REPORT

The purpose of this item is to present the internal and external fault messages, concerning the system that appeared during the previous 63 flights. This item is the sum of the LAST LEG REPORT items over several flights.

LRU IDENT

The purpose of this item is to present the part number of the selected system. The serial number(S/N), the database number (DB/N) and the software number (SW/N) can also be indicated for certain systems.

GROUND SCANNING

The purpose of this item is to reconfigure the computer BITE as being in flight. Fault messages class 1or 2, internal and external fault messages, detected by the BITE during the activation of this function, are displayed in real time on the MCDU and are not memorized.

TROUBLE SHOOTING DATA

The purpose of this item is to present internal snapshot data concerning any failure of any class for airline engineering use. In most cases, it is coded data and sometimes can be accessed from other reports such as LAST LEG REPORT, PREVIOUS LEGS REPORT, TEST and GROUND REPORT.

CLASS 3 FAULTS

The purpose of this item is to present the class 3 fault messages, concerning the system, that appeared during the last flight.

TEST

The purpose of this item is to initiate tests from the MCDU and display the test results with their failure class. If the test takes more than 1 second, TEST IN PROGRESS xxS and the maximun waiting time are displayed. If several types of test exist for a system, they must be displayed in line 2R, 3R, 4R or even on a sub-menu page accessible from line key 6R.
Tests are divided into 3 groups :
- basic or system tests, which have no effect on the A/C, are accessible via key 2R,
- complementary tests, which affect the A/C and require safety precautions, are accessible via key 3R,
- additional tests, which are menu-guided tests, are accessible via key 4R.

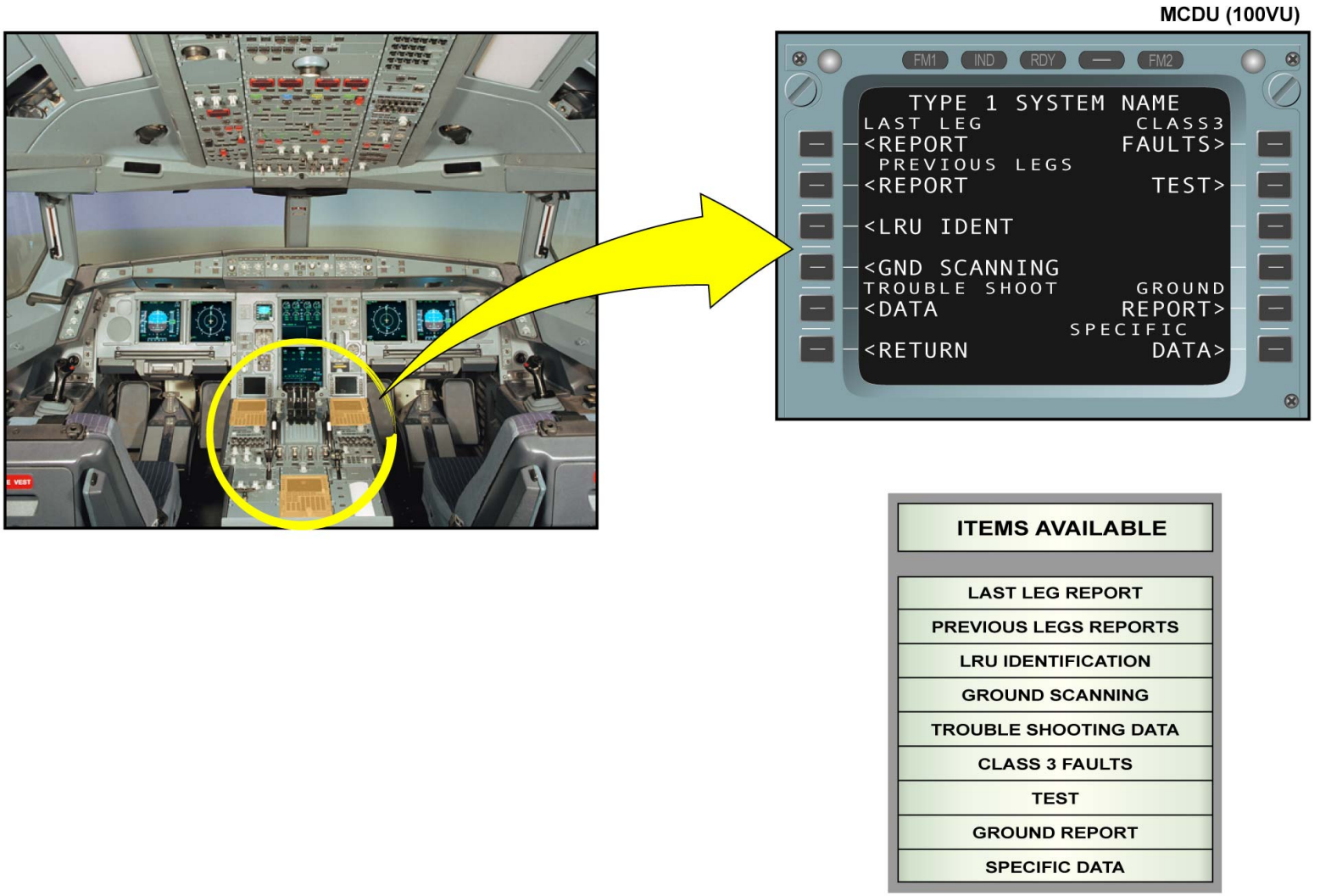
GROUND REPORT

The purpose of this item is to present the internal fault messages which appeared when the A/C was on ground (Not in the PFR).

SPECIFIC DATA

The purpose of this item is to display specific information in order to help the trouble shooting. If only one type of specific data exists in the system, the exact name will be displayed in place of SPECIFIC DATA. If more than 2 types of SPECIFIC DATA exist in a system, they must be displayed on a sub-menu page accessible from line key 6R.

G9409341 - GAUT0T0 - FM45D2F45C70603



TYPE 1 SYSTEM TYPICAL MENU - LAST LEG REPORT ... SPECIFIC DATA

G9409341 - GAUT0T0 - FM45D2F45C70603

CMS OPERATION IN INTERACTIVE MODE (2)

TYPE 1 SYSTEM EXAMPLE MENU

To describe the contents of the different items of a type 1 system, we have chosen the Electric Power Generation System (EPGS), part of the AC ELECTRICAL GENERATION function. The Ground and Auxiliary Power Control Unit (GAPCU) is the interface unit between the EPGS and the CMC, but as the EPGS is controlled by 5 computers (1 GAPCU and 4 GCUs for an A 340), an intermediate page is added to choose the computer from which we have selected the report.
The EPGS menu, which contains most of the type 1 system items, is shown on the figure and will be explained in the following subtopics.

LAST LEG REPORT

This report presents only 2 messages at a time. The fault messages are recorded by the system with the Universal Time Coordinated (UTC) at which the fault occurred, the 6-digit ATA reference and the class of failure, which give access to the Trouble Shooting Data. When no failure has been recorded during the last flight, the NO FAULT DETECTED message is displayed on the MCDU.

PREVIOUS LEGS REPORT

Like the LAST LEG REPORT, this report presents only two messages at a time. The fault messages are identical to the LAST LEG REPORT plus the date at which the failure occurred and the leg number. In addition, the identification of the A/C where the failure occurred is included in the header.

LRU IDENT

This report presents: the name, the part number and, in this example, the serial number of the electronic Line Replaceable Units (LRUs) which are included in the EPGS. Only 2 are displayed at a time.

TROUBLE SHOOTING DATA

This report presents snapshot coded information. The information presented is A/C configuration and system configuration. If no failure has been recorded by the system, the NO FAULT DETECTED message is displayed on the MCDU.

CLASS 3 FAULT

This report presents only 2 messages at a time. The class 3 faults are recorded during the last flight. Only the time and the ATA reference are presented.

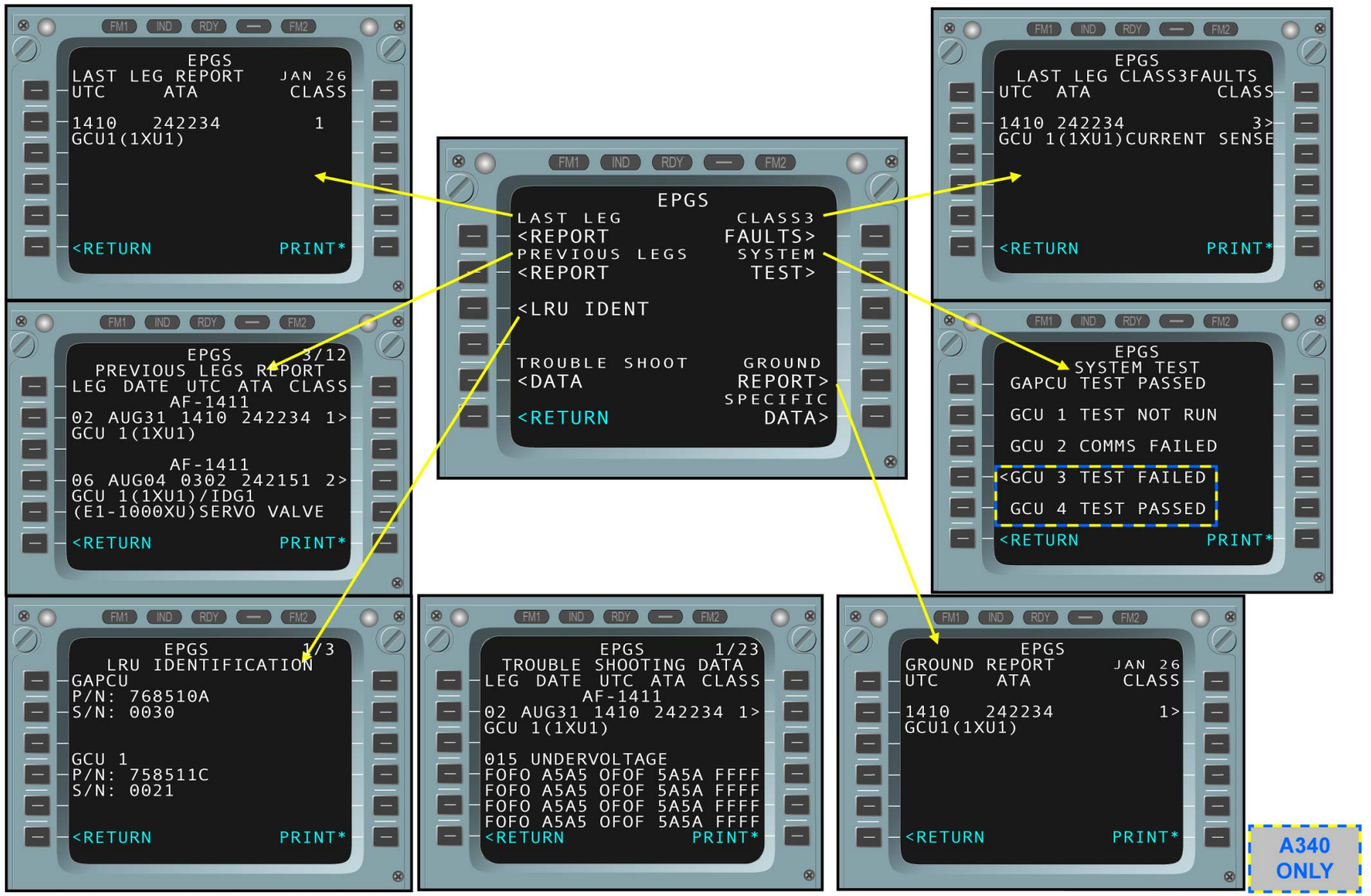
SYSTEM TEST

This item, which is a system test, enables initialization of the power-up test, among other things. All faults detected and presented by the system will be analyzed and reported by this test. If the test is OK, "TEST OK" is displayed on the MCDU.

GROUND REPORT

The characteristics of this report are the same as those of the LAST LEG REPORT but limited to the internal failures of any class. The following screens are a summary of the main screens shown in this topic.

G9409341 - GAUT0T0 - FM45D2F45C70603



TYPE 1 SYSTEM EXAMPLE MENU - LAST LEG REPORT ... GROUND REPORT

G9409341 - GAUT0T0 - FM45D2F45C70603

CMS OPERATION IN INTERACTIVE MODE (2)

TYPE 2 SYSTEM TYPICAL MENU

Unlike the Type 1 Systems, there is no Menu Mode for the Type 2 Systems. These functions are presented on the MCDU by the CMC (pseudo mode menu). The following items shown in the table are always available.

LAST LEG/GND REPORT

The purpose of this item is to present the class 1 and 2 fault messages, concerning the system, that appeared during the last flight and on ground.

LRU IDENT

The purpose of this item is to present the part number of all LRU's of the selected system.

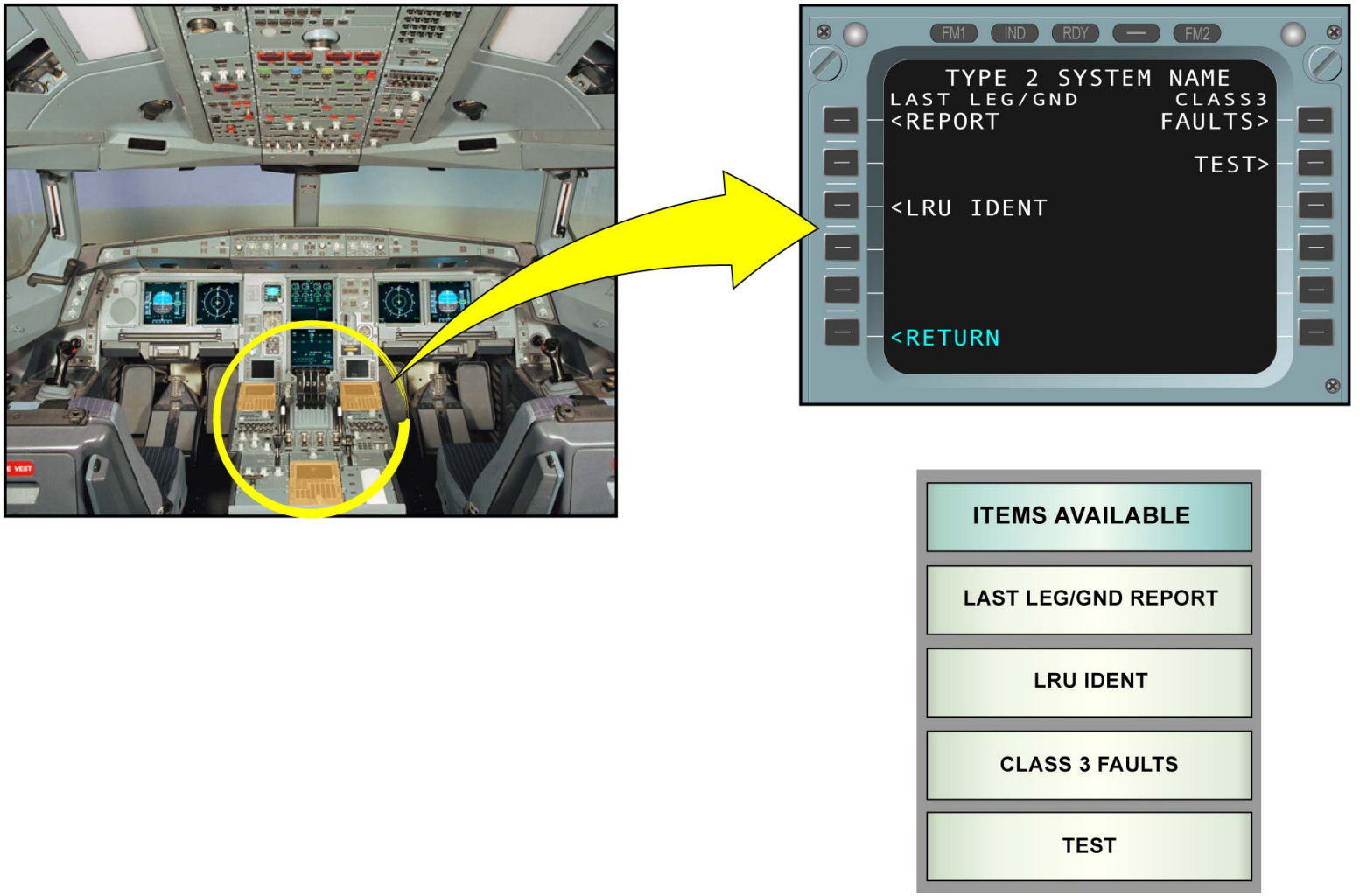
CLASS 3 FAULTS

The purpose of this item is to present the class 3 fault messages concerning the system during the last flight.

TEST

The purpose of this item is to initiate the system test from the MCDU and to display the test result with its failure class. If the test takes more than 1 second, the CMC displays TEST IN PROGRESS xxS with the maximum waiting time.

G9409341 - GAUT0T0 - FM45D2F45C70603



TYPE 2 SYSTEM TYPICAL MENU - LAST LEG/GND REPORT ... TEST

CMS OPERATION IN INTERACTIVE MODE (2)

TYPE 2 SYSTEM EXAMPLE MENU

To describe the contents of the different items of a type 2 system, we have chosen the Battery Charge Limiter 1(BCL) 1, part of the DC ELECTRICAL GENERATION function. This is the BCL 1 menu.

LAST LEG/GND REPORT

This report, formatted by the CMC, presents only 2 at a time, the fault messages with the 6-digit ATA reference and the class of the failure, which are permanently transmitted by the system. In case of failure detected on ground, after touch down, the fault message will be preceded by "GND".

LRU IDENT

This report, formatted by the CMC presents the part number of the BCL 1.

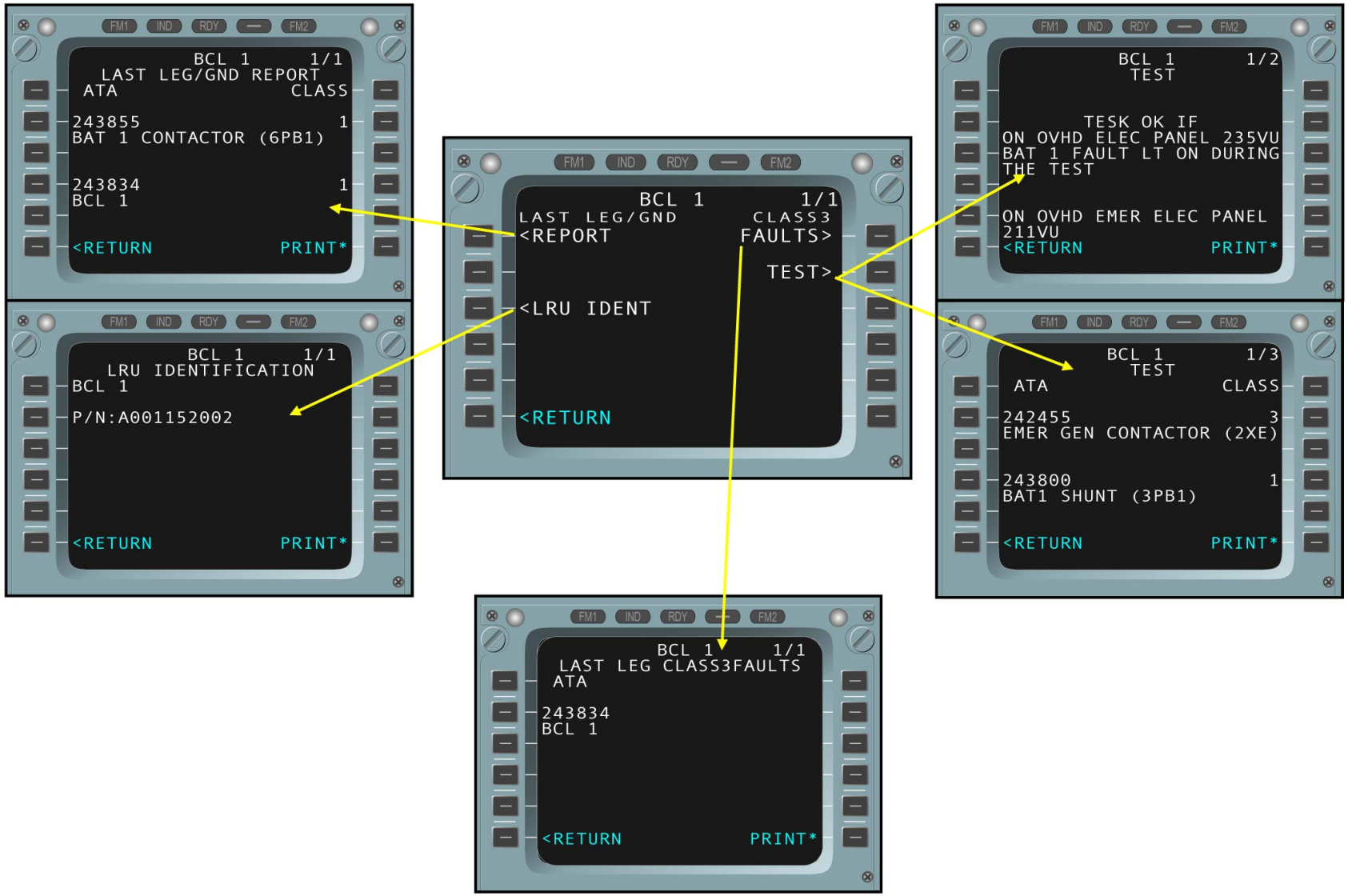
CLASS 3 FAULTS

This report formatted by the CMC, presents, only 2 at a time, the class 3 fault messages with the 6-digit ATA reference, which are permanently transmitted by the system.

TEST

During the progress of the test, some information is provided on the MCDU. If the test is OK, the CMC displays "TEST OK" on the MCDU screen. The following screens are a summary of the main screens shown in the topic.

G9409341 - GAUT0T0 - FM45D2F45C70603



TYPE 2 SYSTEM EXAMPLE MENU - LAST LEG/GND REPORT ... TEST

G9409341 - GAUT0T0 - FM45D2F45C70603

CMS OPERATION IN INTERACTIVE MODE (2)

TYPE 3 SYSTEM TYPICAL MENU

This is a typical type 3 system menu. The menu is fully generated by the CMC.

TEST AND RESET

The only possible item is TEST function or RESET function. In case of failure, the CMC displays the name of the tested or reset component. If the test or reset is OK the CMC displays "TEST or RESET OK".

TYPE 3 SYSTEM EXAMPLE MENU

To describe the contents of the different items, we have chosen 2 examples: Generator Control Unit (GCU) EMERGENCY and then Transformer Rectifier (TR) 1, in the AC and DC GENERATION function.

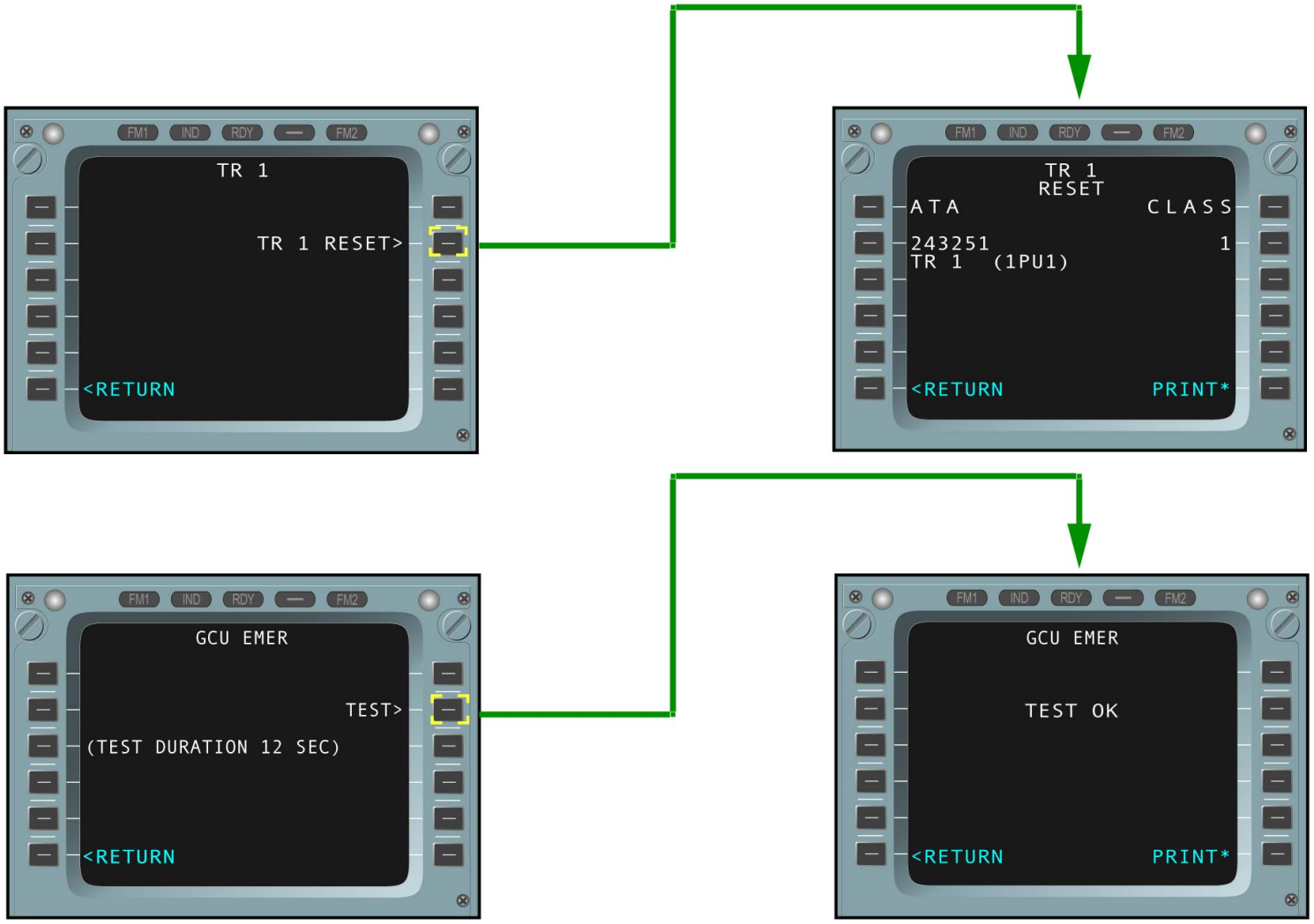
GCU EMER MENU

If the test is OK, the CMC displays "TEST OK" on the MCDU screen. If the test is not successful, the respective messages will appear on the MCDU screen.

TR 1 MENU

If the reset is not successful, the fault message shown on the figure is displayed.

G9409341 - GAUT0T0 - FM45D2F45C70603



TYPE 3 SYSTEM TYPICAL MENU & TYPE 3 SYSTEM EXAMPLE MENU

G9409341 - GAUT0T0 - FM45D2F45C70603

CMS IN NORMAL MODE D/O (3)

GENERAL PARAMETERS

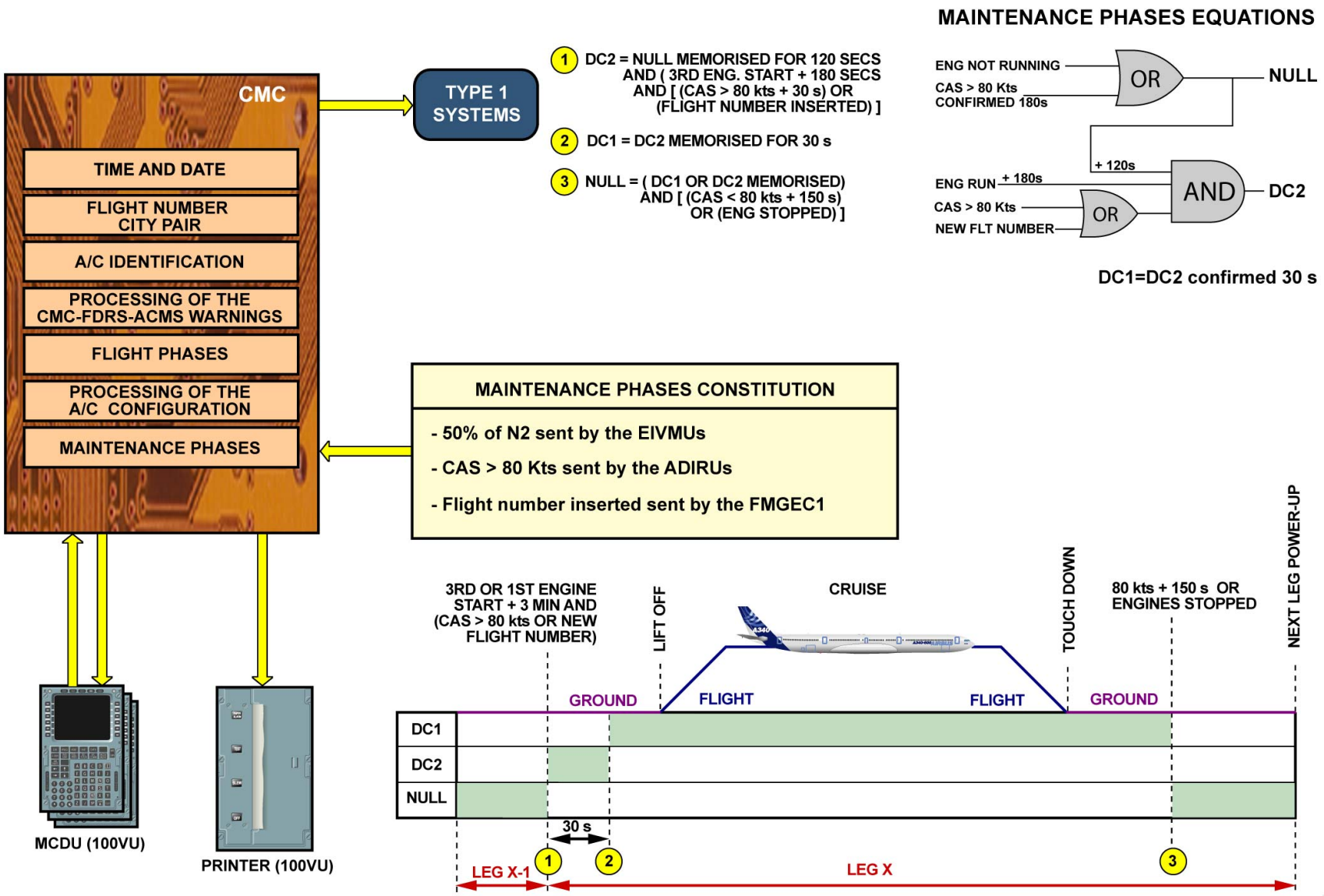
The Central Maintenance Computer (CMC) acquires and dispatches general information to the type 1 systems, and is the interface between the main clock and the system BITE, which use time and date data. If the main clock has failed, the CMC back-up clock takes over.
The CMC is the interface between the Flight Management Guidance and Envelope Computers (FMGECs) and the systems, which use flight number and city pair, such as the Air Traffic Service Unit (ATSU) and the Aircraft Condition Monitoring System (ACMS) only.
The CMC is the interface between the Digital Flight Data Recording System (FDRS) and the system BITE, which use the A/C identification.
In addition to its own warnings, the CMC processes the FDRS and ACMS warnings, which are sent to the Flight Warning Computers (FWCs).
The CMC is the interface between the FWCs and the system BITE concerning the flight phases. The CMC transmits the A/C configuration, which is processed by pin programming to all type 1 system BITE. This configuration is used to know the installation of optional equipment.
The CMC processes the DC1, DC2 and NULL maintenance phases independently from the flight phases and transmits them to all type 1 systems. These maintenance phases control the memorization of the BITE data and the leg management.

CAUTION: in the DC2 maintenance phase, on the A330, start the 1st engine; and on A340, start the 3rd engine.

For the constitution of these maintenance phases, the CMC receives information from various systems.
Type 2 systems process their own FLIGHT/GROUND condition and consequently manage their own data, whereas in type 1 systems, this condition is given by the maintenance phases sent by the CMC. The CMC must process a FLIGHT/GROUND condition to manage type 2 system BITE data. The CMC considers type 2 systems 'in flight' after take-off and 'on ground' after "landing gear compressed".

NOTE: Note: for type 1 systems, the flight condition is given by the NULL maintenance phase while the ground condition is given by the DC1+DC2 maintenance phases, sent by the CMC.

G9409341 - GAUT0T0 - FM45D7F45C80103



GENERAL PARAMETERS

G9409341 - GAUT0T0 - FM45D7F45C80103

CMS IN NORMAL MODE D/O (3)

CENTRAL MAINTENANCE COMPUTER / TYPE 1 SYSTEM

The fault processing, memorization and transmission to the CMC is different in each maintenance phase.

DC2 MAINTENANCE PHASE

When the leg starts, in the type 1 system computer, the contents of the LAST FLIGHT memory are transferred to the PREVIOUS FLIGHTS memory. The GROUND and the CLASS 3 FAULT memories are erased in the CMC, and the contents of the POST FLIGHT memory zone are transferred to the PREVIOUS FLIGHT memory zone.
When an internal class 1 or class 2 fault occurs, after detection and isolation of the faulty Line Replaceable Unit (LRU), the BITE processes a fault message, which is stored in the system BITE memory and transmitted to the CMC, where it is also memorized. At the same time, if there is a warning message, it is also memorized by the CMC.
The AVIONICS STATUS zone memorizes the name of the system affected as long as an external or internal fault is present. If an internal class 3 fault occurs, it is memorized in the system BITE memory.

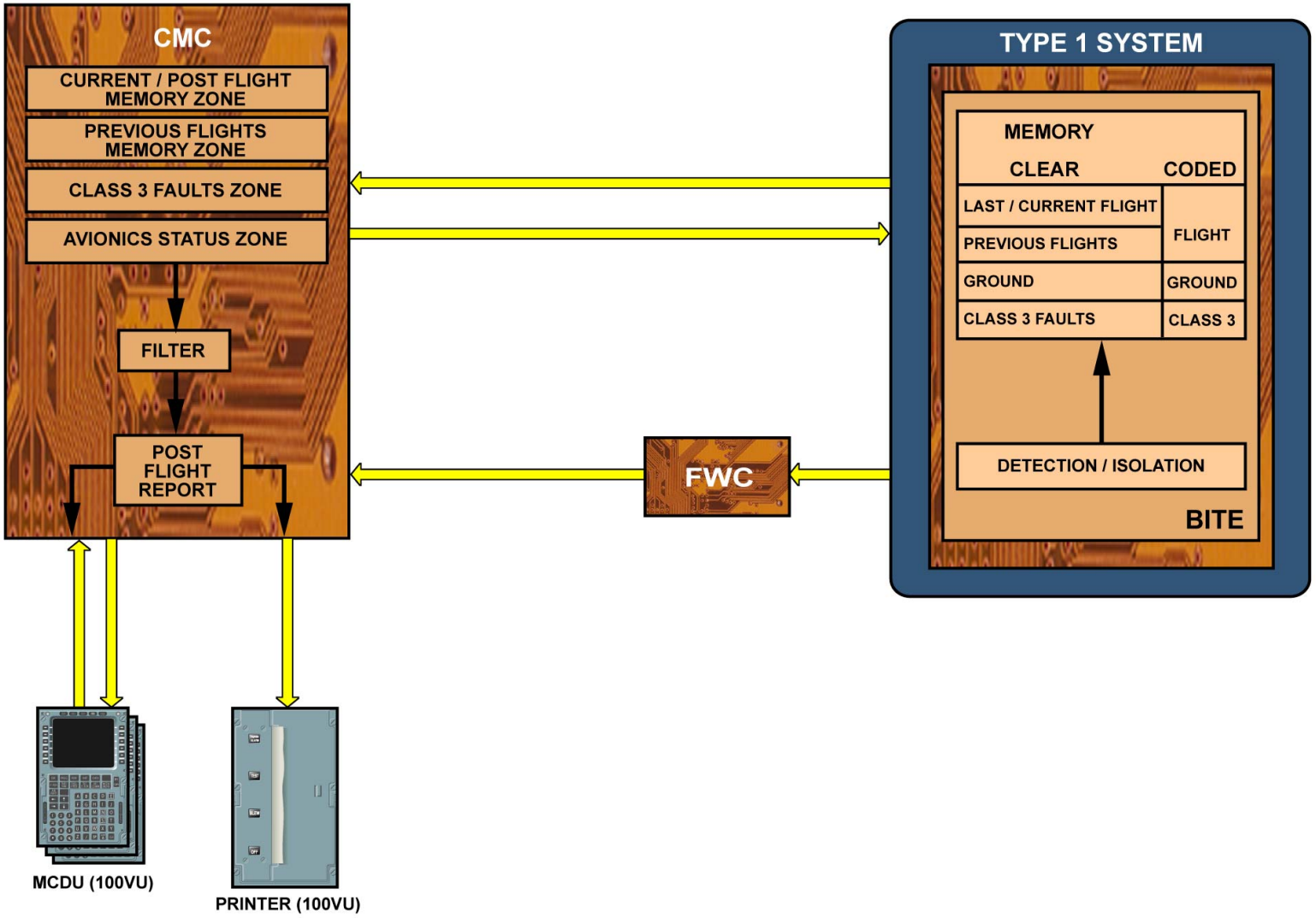
DC1 MAINTENANCE PHASE

When an internal or external class 1 or class 2 fault occurs, after detection and isolation of the faulty LRU, the BITE processes a fault message, which is stored in the system BITE memory and transmitted to the CMC, where it is also memorized. At the same time, if there is a warning message, it is also memorized by the CMC.
The AVIONICS STATUS zone memorizes the name of the system affected as long as the fault is present. If a class 3 fault occurs, it is only memorized in the system BITE memory.
At the end of the flight, DC1/NULL transition, the CMC reanalyzes the fault message consolidation, to determine if it is HARD or INTERMITTENT, and processes the Post Flight Report (PFR), according to the spurious message filter, which is applied.

NULL MAINTENANCE PHASE

The system BITE transmits to the CMC, fault messages of any class, which are due to faults detected in the last flight. This is used to feed the "class 3 zone" when the CLASS 3 REPORT is requested.
When an internal fault of any class occurs, after detection and isolation of the faulty LRU, the BITE processes a fault message, which is stored in the system BITE ground memory only.
The AVIONICS STATUS zone memorizes the name of the system affected as long as an external or internal fault is present. If an internal class 3 fault occurs, it is memorized in the system BITE memory.

G9409341 - GAUT0T0 - FM45D7F45C80103



CENTRAL MAINTENANCE COMPUTER / TYPE 1 SYSTEM - DC2 MAINTENANCE PHASE ... NULL MAINTENANCE PHASE

G9409341 - GAUT0T0 - FM45D7F45C80103

CMS IN NORMAL MODE D/O (3)

CENTRAL MAINTENANCE COMPUTER / TYPE 2 SYSTEM

For type 2 systems, the leg starts at take-off.

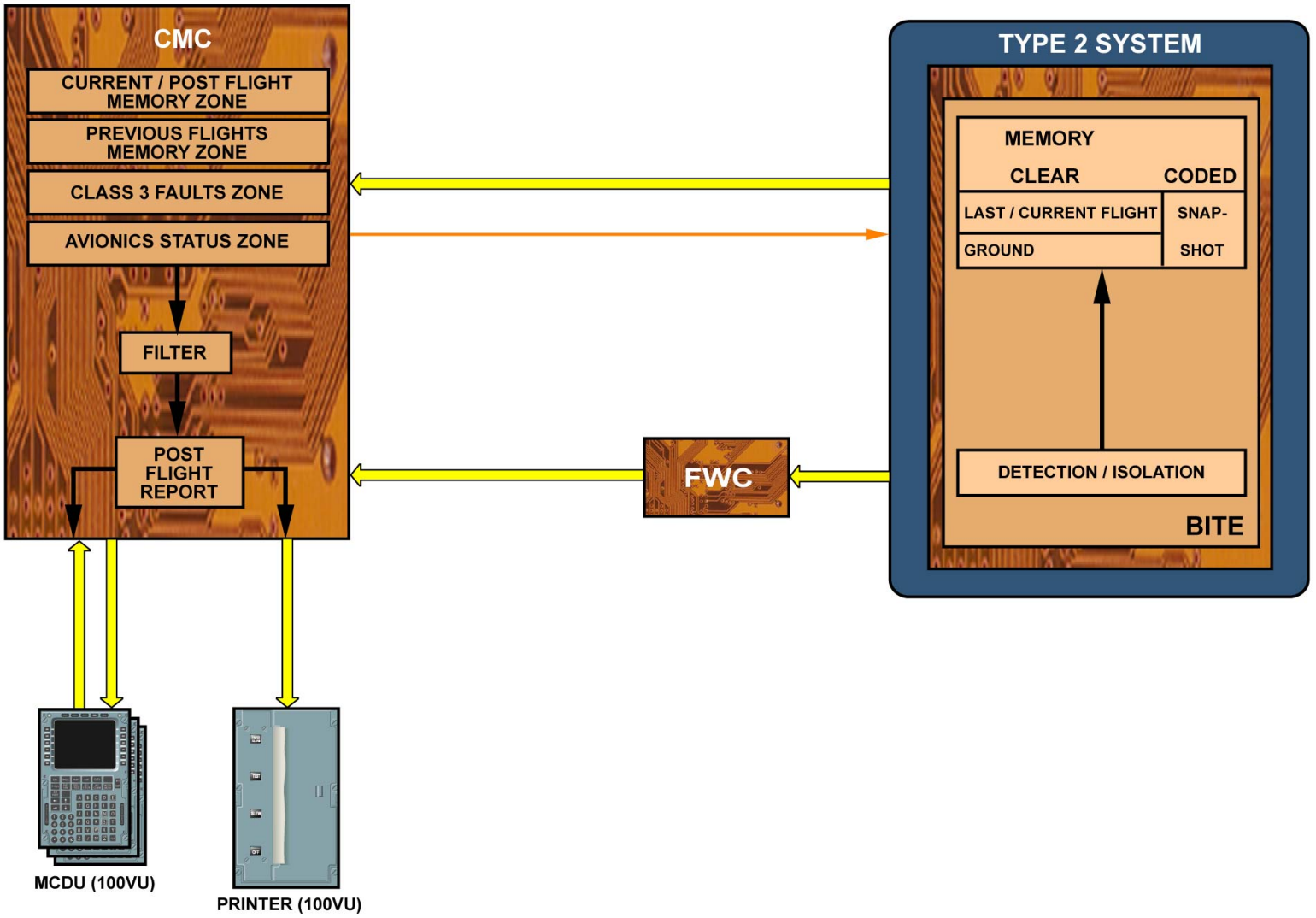
FLIGHT MAINTENANCE PHASE

When the leg starts, the flight and ground system BITE memories are erased.
When an internal or external fault of any class occurs, after detection and isolation of the faulty LRU, the BITE processes a fault message, which is stored in the system BITE memory and transmitted to the CMC, where it is also memorized, except for class 3 faults. At the same time, if there is a warning message, it is also memorized by the CMC.
The AVIONICS STATUS zone memorizes the name of the system as long as the fault is present.

GROUND MAINTENANCE PHASE

The system BITE transmits to the CMC, fault messages of any class, which are due to internal faults detected in the last flight. This is used to feed the "class 3 zone" when the CLASS 3 REPORT is requested.
The type 2 system fault message consolidation is reanalyzed by the CMC at the DC1/NULL transition to process the PFR.
When an internal fault of any class occurs, after detection and isolation of the faulty LRU, the BITE processes a fault message in the system BITE ground memory and transmits it to the CMC to update the AVIONICS STATUS zone. The AVIONICS STATUS zone memorizes the name of the system as long as the fault is present.

G9409341 - GAUT0T0 - FM45D7F45C80103



CENTRAL MAINTENANCE COMPUTER / TYPE 2 SYSTEM - FLIGHT MAINTENANCE PHASE & GROUND MAINTENANCE PHASE

G9409341 - GAUT0T0 - FM45D7F45C80103

CMS IN NORMAL MODE D/O (3)

CENTRAL MAINTENANCE COMPUTER / TYPE 3 SYSTEM

The type 3 system BITE has no memory.

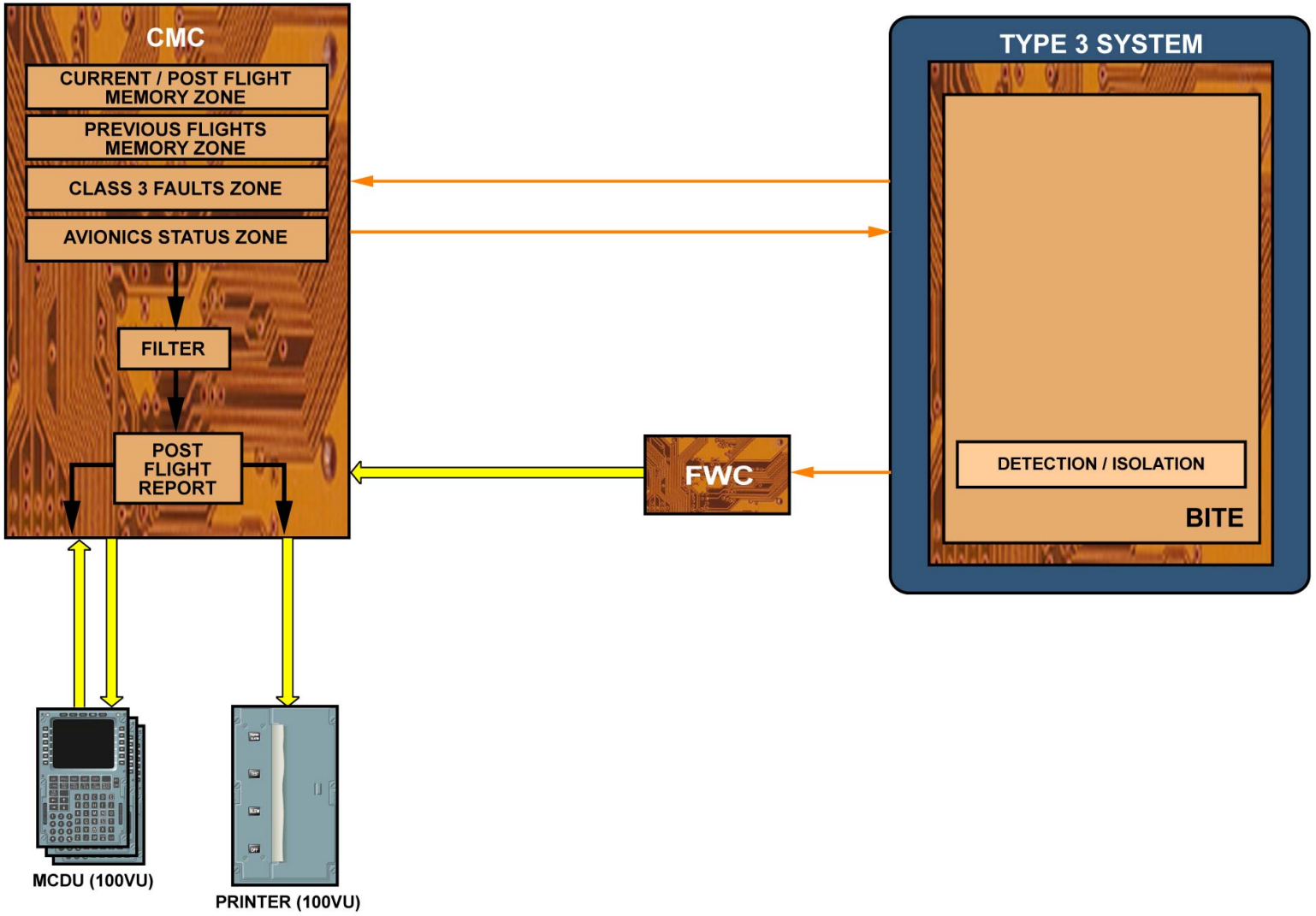
DC 1 + DC 2 MAINTENANCE PHASE

When a type 3 system unit fails, the system status is sent to the CMC. The CMC processes the class 1 fault message and stores it in its CURRENT FLIGHT memory zone. At the same time, if there is a warning message, it is also memorized.
The AVIONICS STATUS zone memorizes the name of the system as long as the fault is present. The CMC consolidates the fault status at DC1/NULL transition to process the PFR.

NULL MAINTENANCE PHASE

The system status is continuously sent to the CMC, but only the AVIONICS STATUS zone is updated (no memorization).
The AVIONICS STATUS zone memorizes the name of the system as long as the fault is present.

G9409341 - GAUT0T0 - FM45D7F45C80103



CENTRAL MAINTENANCE COMPUTER / TYPE 3 SYSTEM - DC 1 + DC 2 MAINTENANCE PHASE & NULL MAINTENANCE PHASE

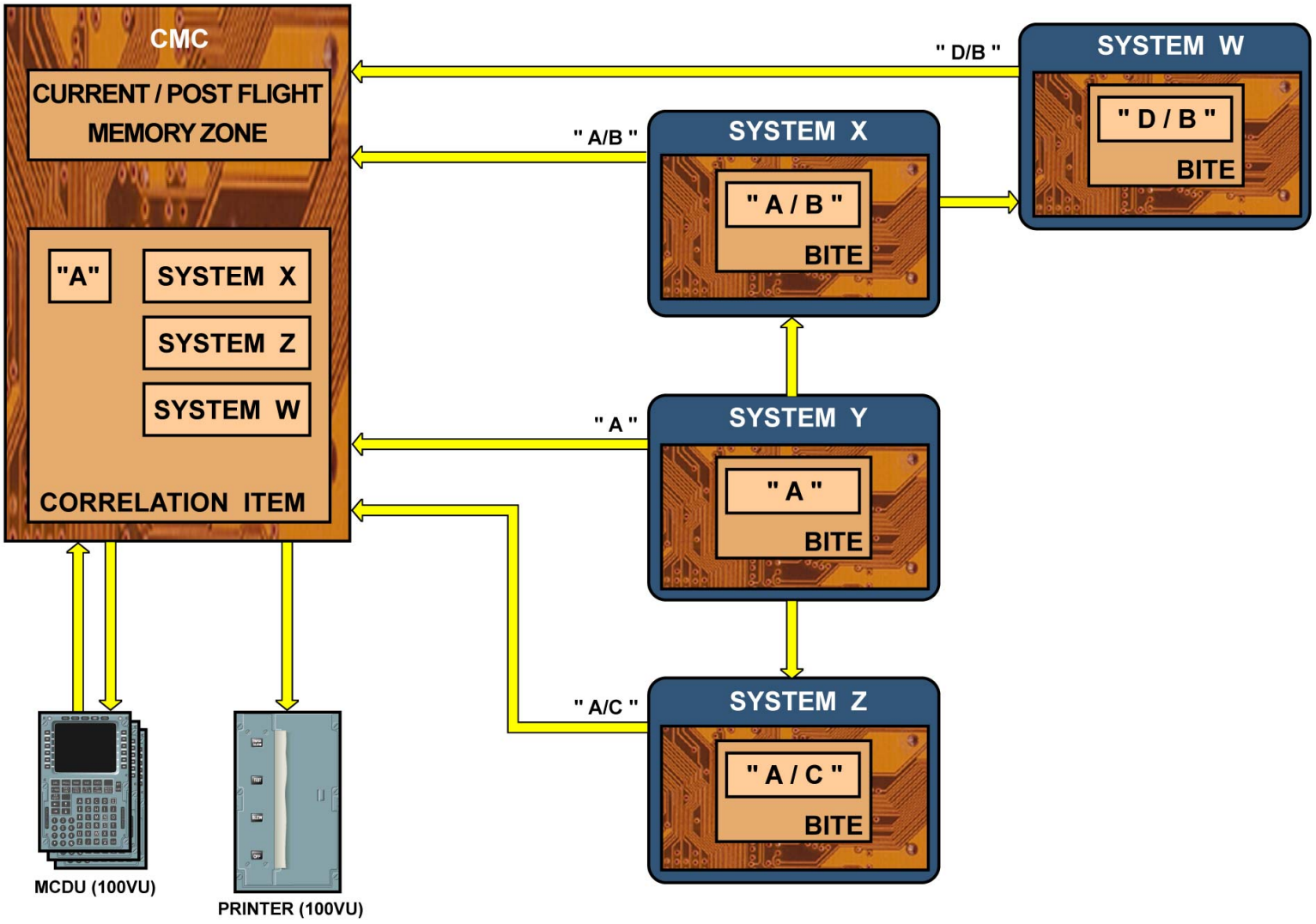
G9409341 - GAUT0T0 - FM45D7F45C80103

CMS IN NORMAL MODE D/O (3)

CORRELATION

The purpose of correlation is to group all the fault messages related to the same event. The association provided between fault messages and ECAM messages on the PFR print-out, is also a correlation: it is based on time and on the ATA references (2 min. correlation). (Only one failure message for one A/C failure event).
When a fault message "A" appears, the CMC opens a correlation item. During 1 min, it associates all the fault messages with the same ATA chapter identification, taking the first 3 or 4 digits, and memorizes, in the correlation item, only the name of the first 6 systems (called IDENTIFIERS), which sent the fault messages.
The CMC also associates the fault messages generated by other systems, operationally affected by this failure, which is an external failure for them. Remember that the fault messages are always memorized in their own system BITE memories. After 1 min, the IDENTIFERS item is closed.
If the message "A" is an internal fault message, it is displayed with its associated source. If it is an external fault message, it is displayed only if there is no internal message concerning the same event. Otherwise, the internal fault will be displayed instead.

G9409341 - GAUT0T0 - FM45D7F45C80103



CORRELATION

G9409341 - GAUT0T0 - FM45D7F45C80103

CMS BACK-UP FUNCTIONS (2)

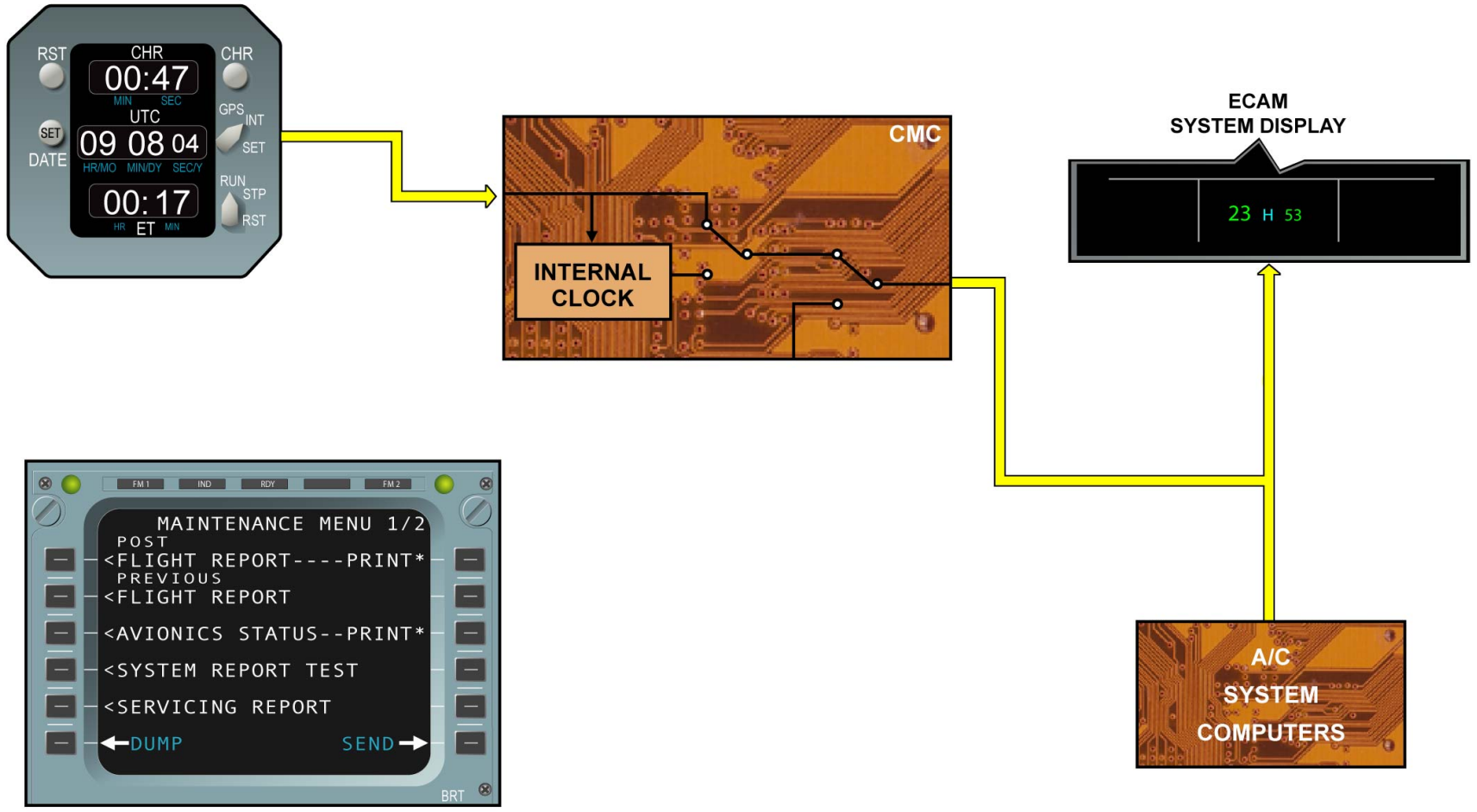
CMS BACK-UP CLOCK FUNCTION

This module describes the Central Maintenance System (CMS) back-up clock function.

NORMAL OPERATION

In normal operation, the main clock gives date and time data to the ECAM and the system BITEs computers through Central Maintenance Computer (CMC). The CMC cyclically checks and validates the time and the date from the clock every second.

G9409341 - GAUT0T0 - FM45D8F45D80303



CMS BACK-UP CLOCK FUNCTION - NORMAL OPERATION

G9409341 - GAUT0T0 - FM45D8F45D80303

CMS BACK-UP FUNCTIONS (2)

CMS BACK-UP CLOCK FUNCTION (continued)

ABNORMAL OPERATION

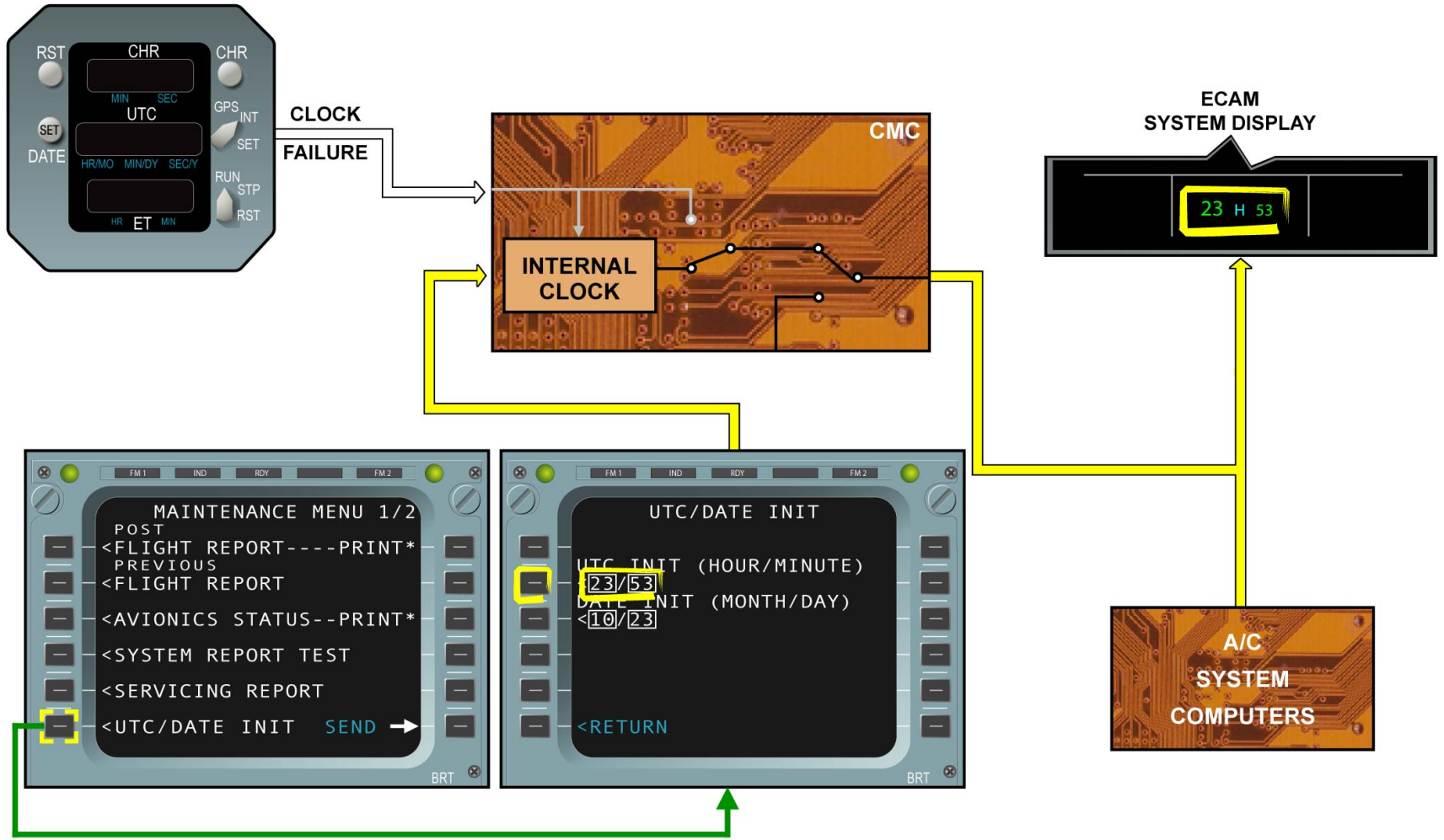
In case of main clock failure (in flight or on ground), the active CMC internal clock takes over. The CMC internal clock supplies time and date to the ECAM and the A/C system computers through a software switching.

In addition, if a long power interruption affects the CMC, (for more than 5 seconds), the UTC/DATE INIT item is added in the CMS menu on the MCDU. In this case time and date are no longer given to the ECAM and A/C system computers.

The UTC-DATE INIT functions enable the crew to start the time and date. In this menu, the UTC and date can be initialized by entering data in the scratchpad and by pressing the related INIT key. This initialization is only possible from one MCDU (No < on the other MCDUs).

Supposing that you have already started the date and entered the UTC in the scratchpad, you have to validate it by pressing the correct key.

G9409341 - GAUT0T0 - FM45D8F45D80303



CMS BACK-UP CLOCK FUNCTION - ABNORMAL OPERATION

G9409341 - GAUT0T0 - FM45D8F45D80303

CMS INTERFACE (3)

GENERAL

Most of the A/C systems communicate with the Central Maintenance Computer (CMC) by High Speed (HS) and Low Speed (LS) ARINC 429 buses and by discretes.

USERS INTERFACES

The CMC communicates through 3 LS ARINC 429 buses (C1 to C3) with the 3 MCDUs, the printer and the Air Traffic Service Unit (ATSU). The CMC also has 1 HS ARINC 429 output communication (com) bus (CMC-Multipurpose Disk Drive Unit (MDDU)).These com buses enable dialog with the CMC and transmission of general parameters (e.g.: maintenance phases, flight phases). Protocol transmission and BITE information
The CMC is fed by these user interfaces through LS and HS ARINC 429 buses for protocol transmission and BITE information. Each MCDU is also linked to the CMC by a discrete (ON/OFF).

SYSTEM TYPES COMPUTERS

There is a detailed description of the different type systems.

TYPE 1 SYSTEM

The CMC communicates with Type 1 system computers through 6 LS A429 buses (M1 to M6). In interactive mode these maintenance buses enable dialog between the CMC and the system BITEs. In normal mode, they allow the dispatch of acquired general parameters (e.g. time from the clock) to the system BITEs.
In normal mode, each Type 1 system computer permanently transmits BITE information to the CMC through LS or HS A429 buses. Some Type 1 systems also transmit general parameters (e.g. time and date from the clock, soft pin prog from the ADIRU, warning messages and flight phases from FWC). In interactive mode, the Type 1 system computers transmit displayable information on these buses (text, characters) processed by their BITE.

TYPE 2 SYSTEM

The CMC controls each Type 2 system computer with a discrete which is used to test the system. Each Type 2 system computer permanently transmits BITE information through an A429 LS bus and the result of the test.

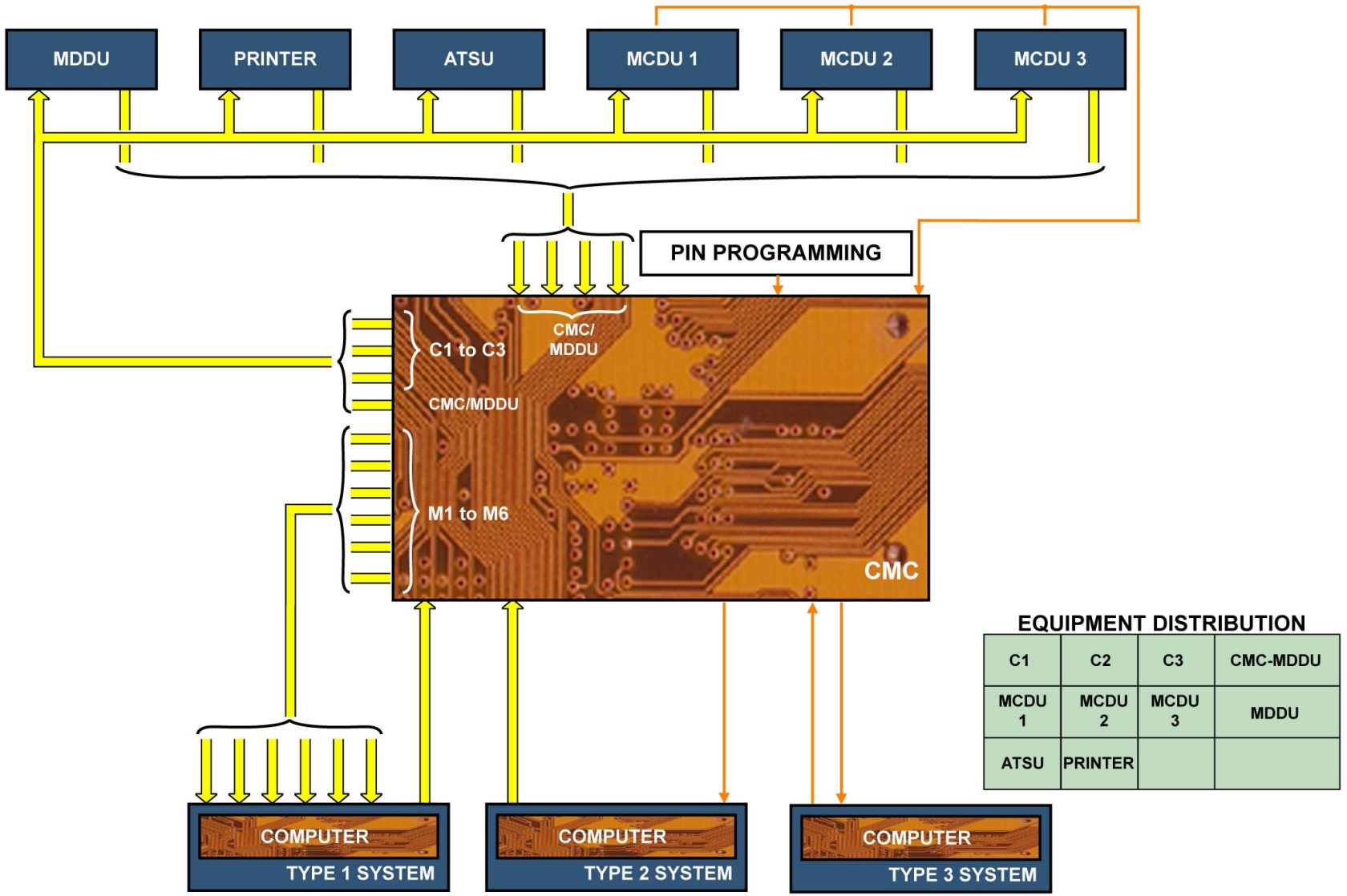
TYPE 3 SYSTEM

The CMC controls each Type 3 system with a discrete which is used to test or reset the system. Each Type 3 system indicates its status with a discrete.

PIN PROGRAMMING

Upon energization, the CMC process its own configuration according to software pin program received by ARINC messages and hardware pin program directly connected to the CMC. The CMC uses the hardware pin program to determine the A/C configuration (e.g. CMC side, A/C Type) and the optional equipment.

G9409341 - GAUT0T0 - FM45DC000000002



EQUIPMENT DISTRIBUTION

C1	C2	C3	CMC-MDDU
MCDU 1	MCDU 2	MCDU 3	MDDU
ATSU	PRINTER		

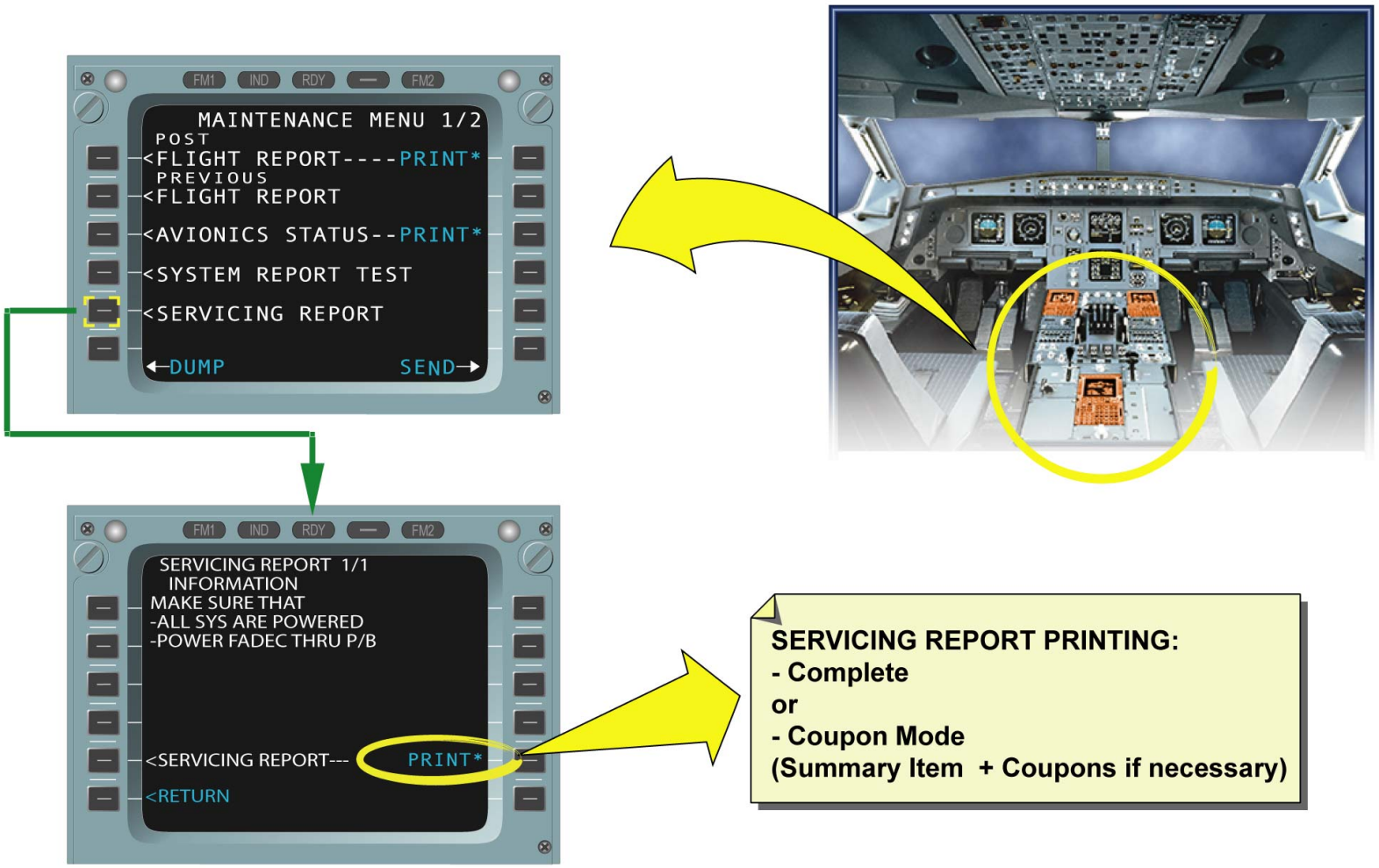
GENERAL ... PIN PROGRAMMING

SERVICING REPORT D/O (3)

GENERAL

The SERVICING REPORT function provides, in flight or on ground, report of different parameters, which have to be periodically checked, and which may induce servicing actions. The servicing report is accessible through the MCDU. It can also be printed, dumped or transmitted to the Air Traffic Service Unit (ATSU).

G9409341 - GAUT0T0 - FM45D4F45SA0203


FM1
IND
RDY
FM2
MAINTENANCE MENU 1/2
POST
<FLIGHT REPORT----PRINT*
PREVIOUS
<FLIGHT REPORT
<AVIONICS STATUS--PRINT*
<SYSTEM REPORT TEST
<SERVICING REPORT
←DUMP
SEND→
FM1
IND
RDY
FM2
SERVICING REPORT 1/1
INFORMATION
MAKE SURE THAT
-ALL SYS ARE POWERED
-POWER FADEC THRU P/B
<SERVICING REPORT---
PRINT*
<RETURN
SERVICING REPORT PRINTING:
- Complete
or
- Coupon Mode
(Summary Item + Coupons if necessary)

GENERAL

SERVICING REPORT D/O (3)

REPORT

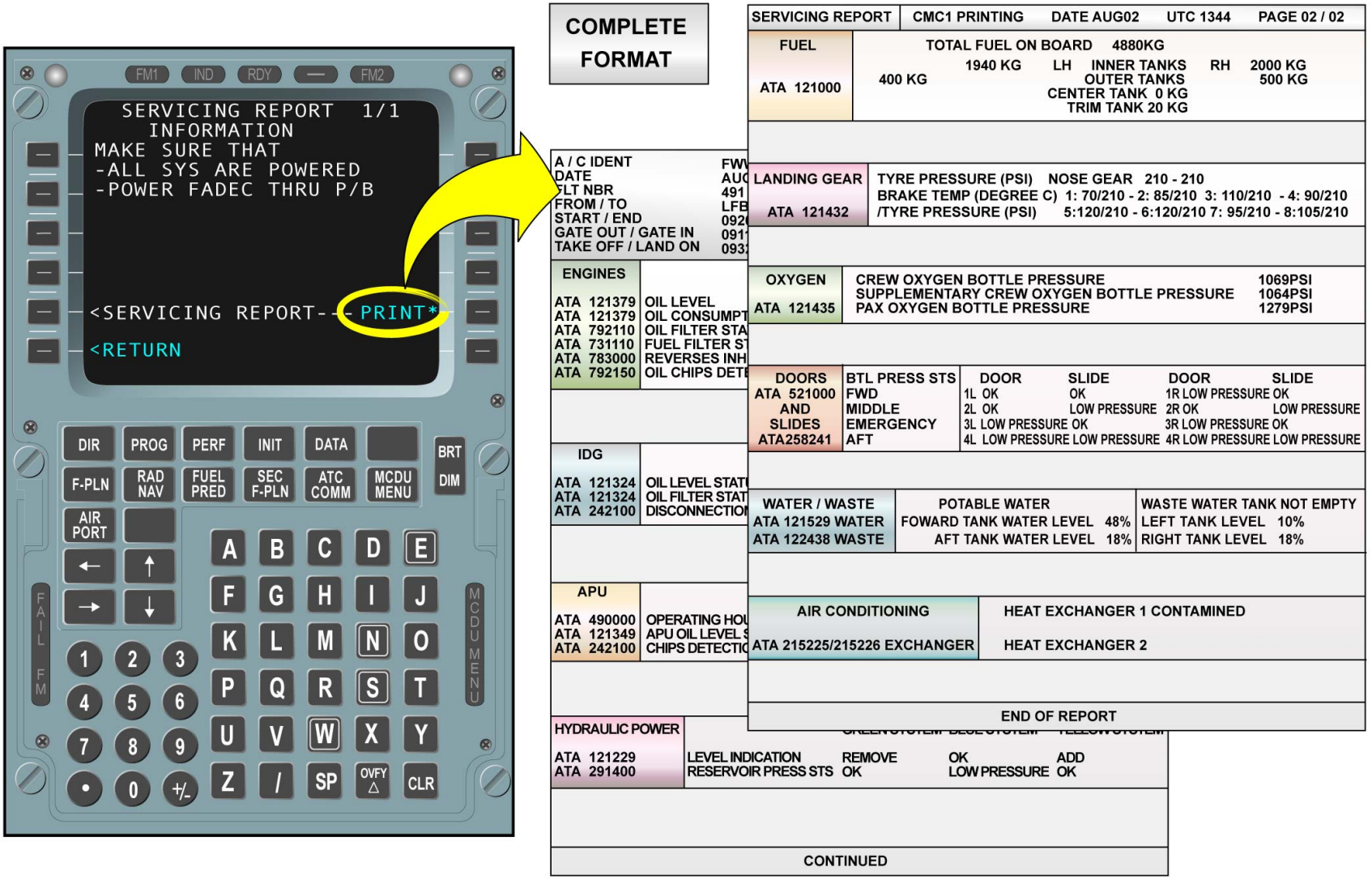
The servicing report is composed of the different items listed in the table as:
- engines,
- Integrated Drive Generator (IDG),
- APU,
- hydraulic,
- fuel,
- L/G,
- oxygen,
- door and slide bottles,
- water/waste,
- air conditioning.

The servicing report can be presented in 3 ways:
- complete format,
- coupon mode printout,
- MCDU presentation.

COMPLETE FORMAT

In this case the report is composed of all servicing and summary items presented on two pages. This report is printable manually or automatically. The report shown in the next figures are presented as an example.

G9409341 - GAUT0T0 - FM45D4F45SA0203



REPORT - COMPLETE FORMAT

G9409341 - GAUT0T0 - FM45D4F45SA0203

SERVICING REPORT D/O (3)

REPORT (continued)

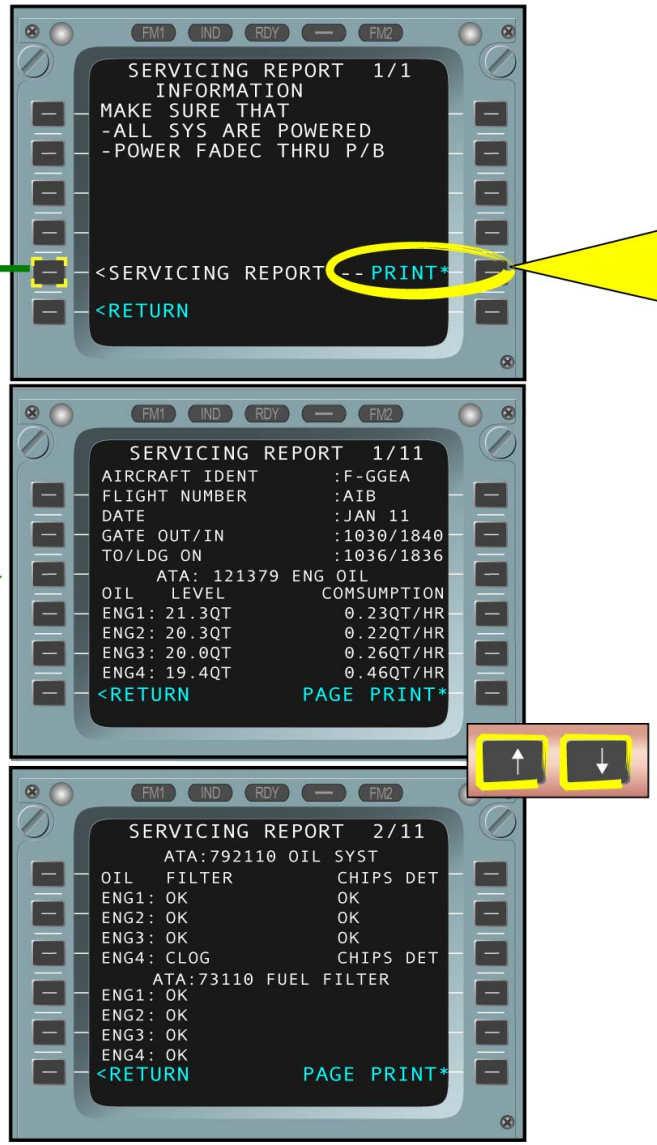
COUPON MODE

The purpose of the coupon mode is to present to the user only items needing action.
First, a SUMMARY COUPON is printed, followed by the items where a parameter is under the minimum or above the maximum value of a threshold. If a servicing item status is CHECK in the summary coupon, the summary coupon will be followed by the servicing item coupon, otherwise the status is OK.

MCDU PRESENTATION

The servicing report which is displayed on the MCDU is complete and therefore includes all parameters. It consists of 11 MCDU pages. Pressing the up and down arrow keys gives you access to the next (or previous) pages that make up the servicing report. The MCDU is only used as a back-up means for checking the servicing report.

G9409341 - GAUT0T0 - FM45D4F45SA0203



COUPONS MODE

A / C IDENT	FWWAI	MAINTENANCE	CMC1 PRINTING
DATE	AUG22		
FLT NBR	UVWXYZ5678		PAGE 01 / 01
FROM / TO	LFMN/LFPO	DB / N -	DATE AUG22
START / END	0920 / 1104		UTC 1206
GATE OUT / GATE IN	0911 / 1113		
TAKE OFF / LAND ON	0932 / 1103		

ENGINES-OIL LVL	FLTR CHIPS	FUEL FLTR REV	OK
IDG-OIL LVL	STS FLTR DISC		OK
APU-OIL LVL	LVL STS CHIPS		OK
HYDRAULIC SYSTEMS-LVL	RSVR AIR PRESS		CHECK
FUEL TANKS-QTY			OK
LANDING GEAR-TEMP PRESS			OK
OXYGEN BOTTLES-BTL PRESSURE			OK
DOORS AND SLIDES BTL-PRESS STS			OK
WATER/WASTE TANK-LVL			OK
AIR CONDITIONING-EXCHANGER FLTR			OK

END OF SERVICING REPORT SUMMARY COUPON

A / C IDENT	F-ESSAI	MAINTENANCE	CMC1 PRINTING
DATE	AUG22	SERVICING HYDRAULIC SYSTEMS COUPON	
FLT NBR	UVWXYZ5678	DB / N -	PAGE 01 / 01
FROM / TO	LFMN/LFPO		DATE AUG22
START / END	1135 / 1137		UTC 1207

HYDRAULIC POWER		GREEN SYSTEM	BLUE SYSTEM	YELLOW SYSTEM
ATA 121229	LEVEL INDICATION	REMOVE	OK	ADD
ATA 291400	RESERVOIR PRESS STS	OK	LOW PRESSURE	OK

END OF COUPON

REPORT - COUPON MODE & MCDU PRESENTATION

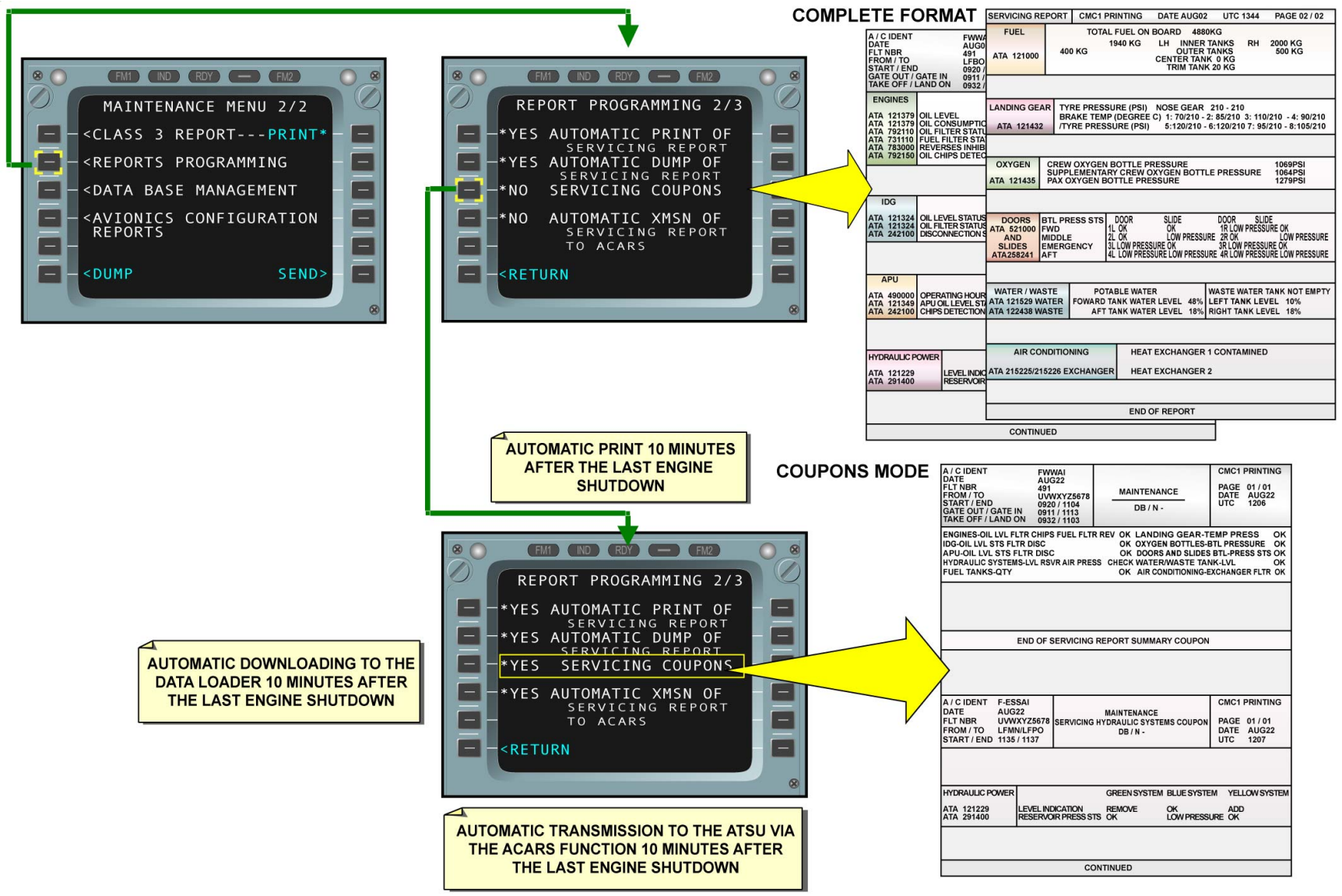
G9409341 - GAUT0T0 - FM45D4F45SA0203

SERVICING REPORT D/O (3)

PROGRAMMING

It is possible to program, through the MCDU, certain functions related to the servicing report. You can program a complete report or a coupon mode report.
You can also program the automatic transmission to the printer, the ATSU, and the Multipurpose Disk Drive Unit (MDDU). Non-programmed printouts, dumps or transmissions to the ground have to be made manually.

G9409341 - GAUT0T0 - FM45D4F45SA0203



PROGRAMMING

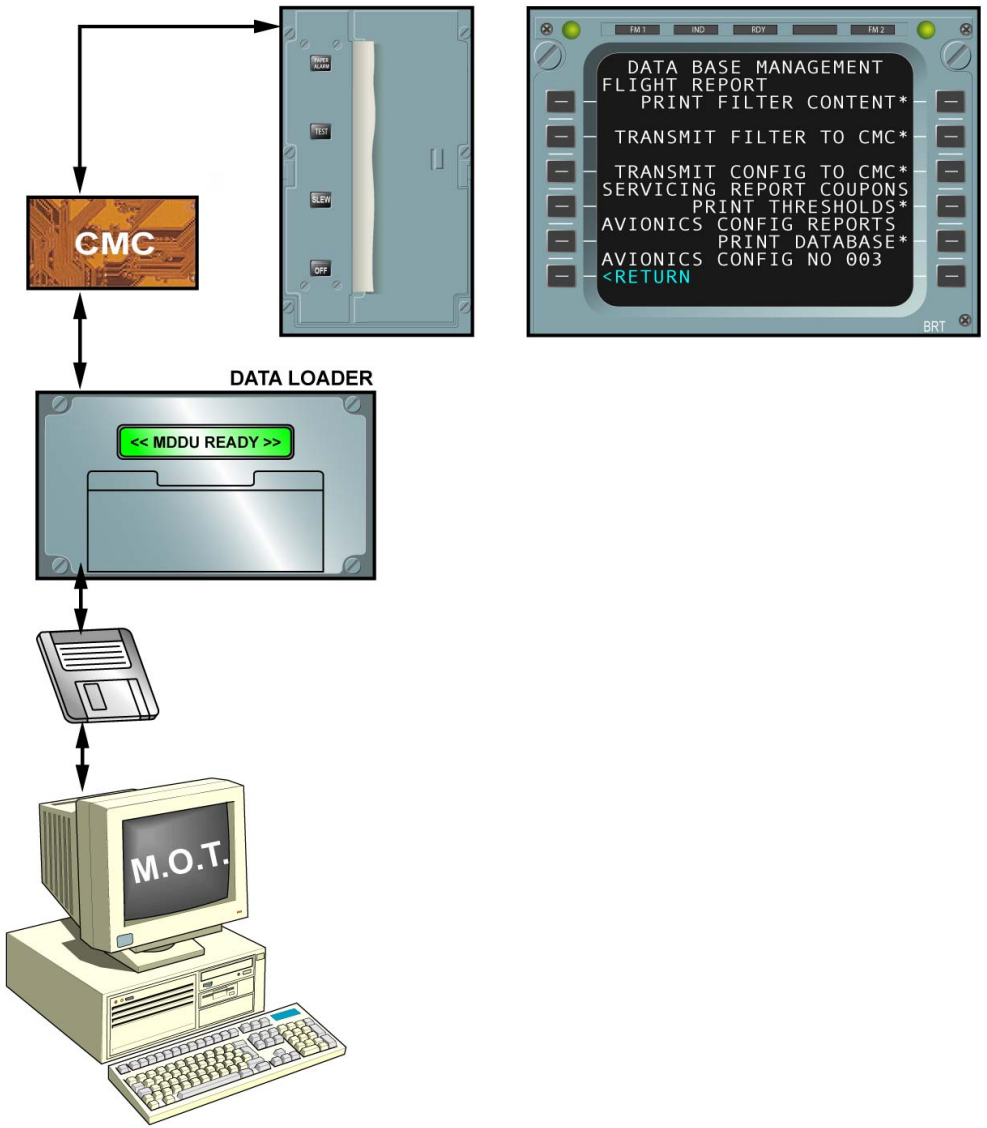
G9409341 - GAUT0T0 - FM45D4F45SA0203

SERVICING REPORT D/O (3)

THRESHOLD AND TEXT INSERTIONS

The airline engineering first needs to define the various thresholds which will be used for the servicing report. The purpose of these thresholds is to automatically trigger a coupon if they are exceeded. The airline can also add comments and information texts between the coupons.
Report threshold and text insertions are made on a personal computer using software called a Maintenance Option Tool (MOT). Then, when this programming is made, it is loaded in the Central Maintenance Computer (CMC) using the data loader. The servicing report thresholds and information texts database is printed automatically after uploading.
Manual printing of the servicing report thresholds and information texts database can be done through an MCDU menu. The report shown in the next figure is presented as an example.

G9409341 - GAUT0T0 - FM45D4F45SA0203



A / C IDENT F-ESSAN | MAINTENANCE | CMC1 PRINTING
SERVICING REPORT COUPONS THRESHOLDS DATA BASE
DB/N CPA
NOTE: MAXIMUN THRESHOLD IS PRINTED ABOVE
MINIMUN THRESHOLD IS PRINTED BELOW
PAGE 02 / 02
DATE AUG02
UTC 1159

A / C IDENT F-ESSAN | MAINTENANCE | CMC1 PRINTING
SERVICING REPORT COUPONS THRESHOLDS DATA BASE
DB/N CPA
NOTE: MAXIMUN THRESHOLD IS PRINTED ABOVE
MINIMUN THRESHOLD IS PRINTED BELOW
PAGE 01 / 02
DATE AUG02
UTC 1159

ENGINES	ENGINE 1	ENGINE 2	ENGINE 3	ENGINE 4
OIL LEVEL	99.0 QT	99.0 QT	99.0 QT	99.0 QT
	21.0 QT	21.0 QT	21.0 QT	21.0 QT
OIL CONSUMPTION	0.5 QT/HR	0.5 QT/HR	0.5 QT/HR	0.5 QT/HR
	0 QT/HR	0 QT/HR	0 QT/HR	0 QT/HR

UPLOADABLE INFORMATION TEXT

IDG

UPLOADABLE INFORMATION TEXT

APU
OPERATING HOURS 00000 HOURS
0 HOURS
NUMBER OF START CYCLES 00000

UPLOADABLE INFORMATION TEXT

HYDRAULIC POWER

FUEL
TOTAL FUEL ON BOARD 000000 KG
5000 KG
000000 KG 0 KG LH INNER TANKS RH 000000 KG 0 KG
000000 KG 0 KG OUTER TANKS 000000 KG 0 KG
CENTER TANK 000000 KG
0 KG
TRIM TANK 000000 KG
0 KG

UPLOADABLE INFORMATION TEXT

THRESHOLD AND TEXT INSERTIONS

G9409341 - GAUT0T0 - FM45D4F45SA0203

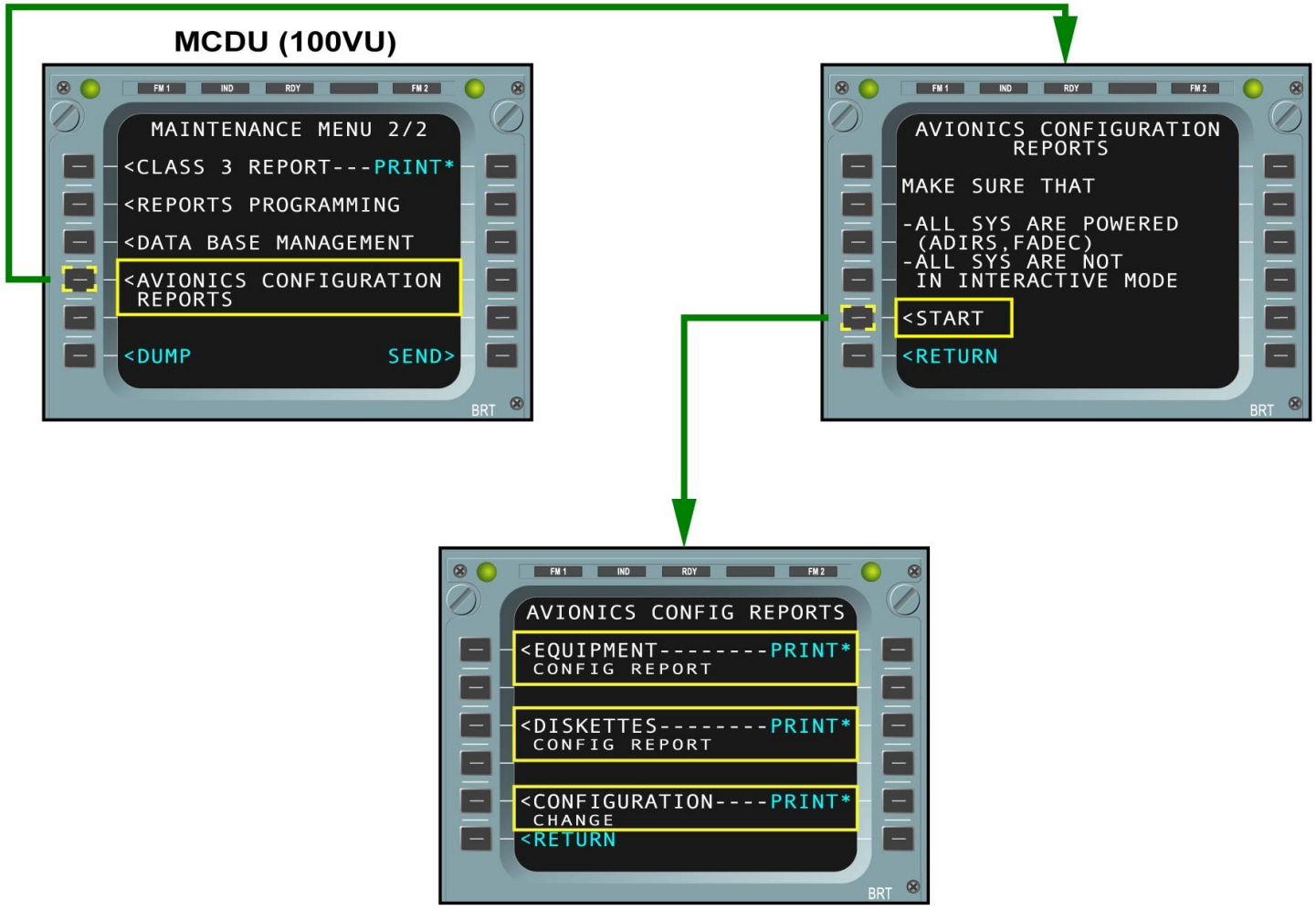
AVIONICS CONFIGURATION REPORTS D/O (3)

GENERAL

The purpose of this function is to present a compilation of CONFIGuration (CONFIG) information of the A/C computer part numbers and software diskettes (also available in the Line Replaceable Unit Identification (LRU IDENT) in each BITE menu). From the Central Maintenance System (CMS) MCDU MENU, the function AVIONICS CONFIG REPORTS enables access to:
- the EQUIPMENT CONFIG REPORT,
- DISKETTES CONFIG REPORT,
- CONFIGURATION CHANGE.

NOTE: Note: this function is only available on ground and during the NULL maintenance phase.

G9409341 - GAUT0T0 - FM45D5F45AA0103


MCDU (100VU)
MAINTENANCE MENU 2/2
<CLASS 3 REPORT---PRINT*
<REPORTS PROGRAMMING
<DATA BASE MANAGEMENT
<AVIONICS CONFIGURATION REPORTS
<DUMP
SEND>
AVIONICS CONFIGURATION REPORTS
MAKE SURE THAT
-ALL SYS ARE POWERED (ADIRS,FADEC)
-ALL SYS ARE NOT IN INTERACTIVE MODE
<START
<RETURN
AVIONICS CONFIG REPORTS
<EQUIPMENT--------PRINT*
CONFIG REPORT
<DISKETTES--------PRINT*
CONFIG REPORT
<CONFIGURATION----PRINT*
CHANGE
<RETURN

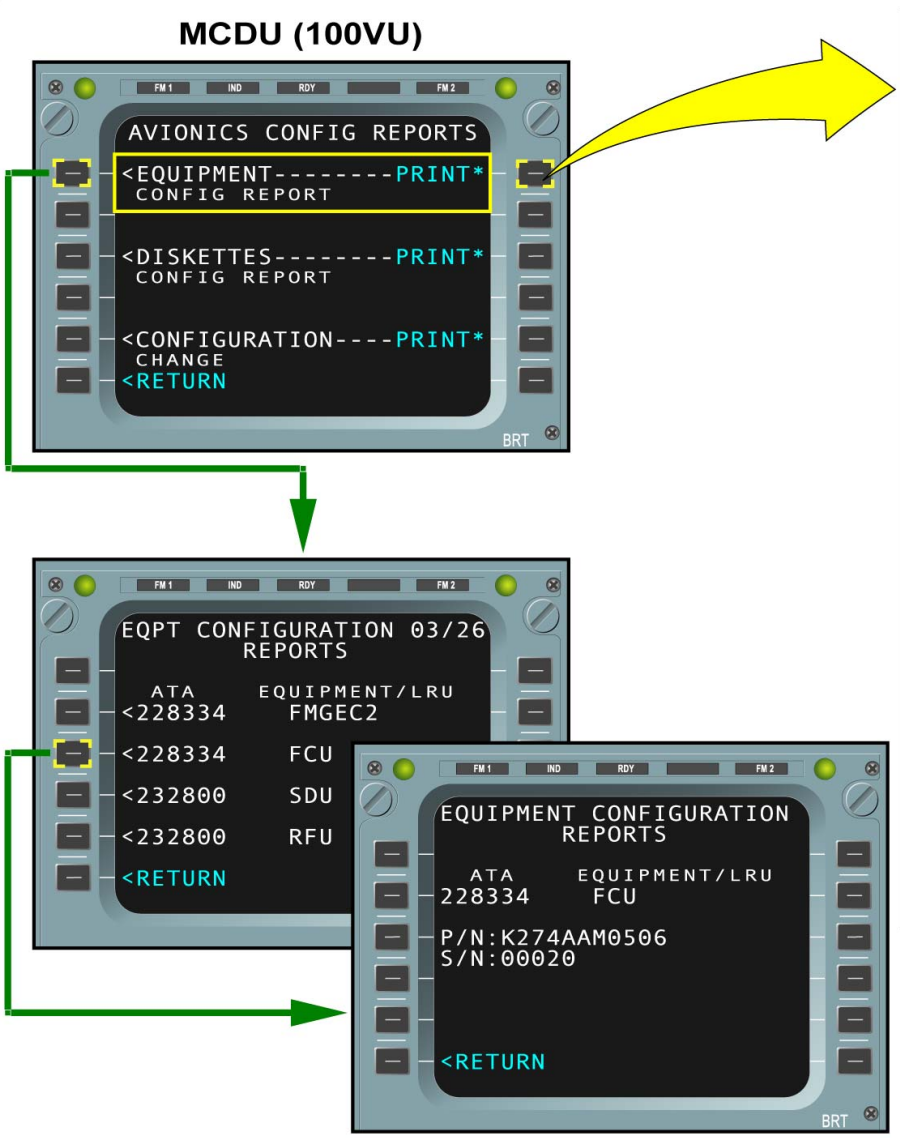
GENERAL

AVIONICS CONFIGURATION REPORTS D/O (3)

EQUIPMENT CONFIG REPORT

This report provides the list of computer part numbers and, for some, the serial number and/or the database number.
The part number and serial number are directly read from the computer memory or On Board Replaceable Modules (OBRMs), thus no updating is necessary.
They are displayed on the MCDU or they can be printed.

G9409341 - GAUT0T0 - FM45D5F45AA0103



MAINTENANCE
EQUIPMENT CONFIGURATION REPORT

AIRCRAFT IDENTIFICATION FWWAI		PRINTING DATE AUG02 UTC 1347	
ATA 212634	NAME AEVC SYSTEM AEVC	P/N: 785-611-X5 S/N: 0007	
ATA 213134	NAME CPC1 SYSTEM CPC1	P/N: 7125-18086-4	
ATA 213134	NAME CPC2 SYSTEM CPC2	P/N: 7125-18086-4	
ATA 212634	NAME FMGEC1 SYSTEM AFS	P/N: B490AAX0N95 S/N: 0007	DB/N1: 0817
ATA 228334	NAME FCU SYSTEM AFS	P/N: K274AAM0506 S/N: 00020	
ATA 228334	NAME MCDU1 SYSTEM AFS	P/N: K275AAP0202 S/N: 91030131	
ATA 228334	NAME MCDU2 SYSTEM AFS	P/N: K275AAP0202 S/N: 91030129	
ATA 228334	NAME MCDU3 SYSTEM AFS	P/N: K275AAP0202 S/N: 91030141	
ATA 228334	NAME FMGEC2 SYSTEM AFS	P/N: K490AAM0207 S/N: 00023	DB/N1: 0817
ATA 232600	NAME SDU SYSTEM SATCOM	P/N: 7516100-18036 S/N: 0536	DB/N1: S/WM N
ATA 232600	NAME RFU SYSTEM SATCOM	P/N: 7516240-18036 S/N: 95050520	DB/N1: S/WM E
ATA 232600	NAME HPH SYSTEM SATCOM	P/N: 7516250-18036 S/N: 95050695	DB/N1: S/WM C
ATA 232600	NAME ORT SYSTEM SATCOM	P/N: GAF-A340-180 S/N: 95050695	DB/N1: S/WM C
ATA 235134	NAME ACP1 SYSTEM AIS	P/N: 2788AC01	
ATA 235134	NAME ACP2 SYSTEM AIS	P/N: 2788AC01	
ATA 235134	NAME ACP3 SYSTEM AIS	P/N: 2788AC01	
ATA 235134	NAME ACP4 SYSTEM AIS	P/N: 2788AC01	

CONTINUED

EQUIPMENT CONFIG REPORT

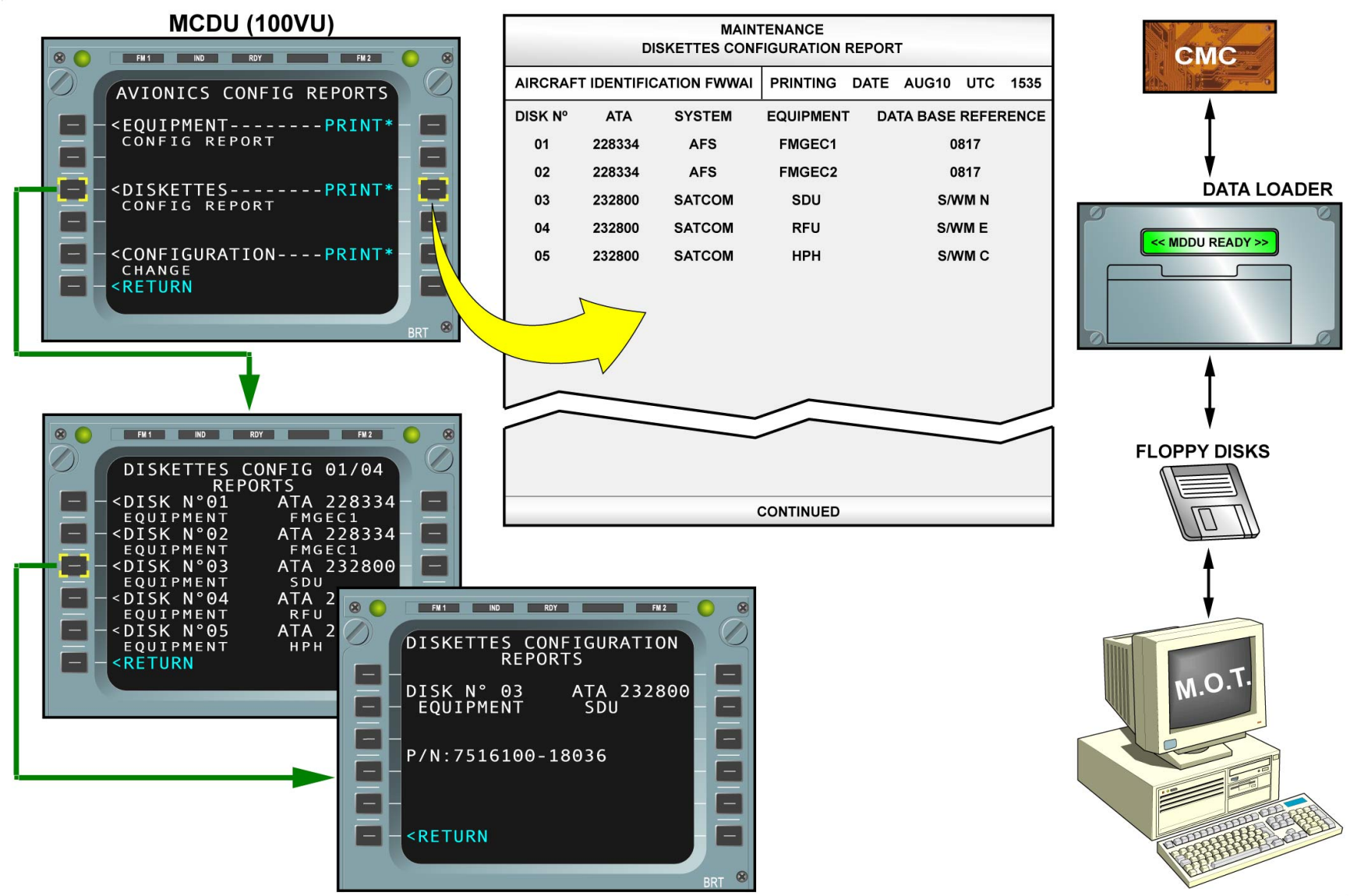
G9409341 - GAUT0T0 - FM45D5F45AA0103

AVIONICS CONFIGURATION REPORTS D/O (3)

DISKETTES CONFIG REPORT

On each A/C, a set of floppy disks is available in the cockpit. They contain databases necessary for the operation of some computers. The purpose of this report is to record and check the version of these floppy disks.
The DISKETTES CONFIG REPORT is first defined by the airline engineering using a Maintenance Option Tool (MOT), then loaded in the CMC. The CMC will keep this report updated because it can read the database numbers directly from the computers.
This report is displayed on the MCDU or can be printed.
Pushing the line key adjacent to avionics CONFIG reports gives you access to the different MCDU screens as presented in the following example.

G9409341 - GAUT0T0 - FM45D5F45AA0103



DISKETTES CONFIG REPORT

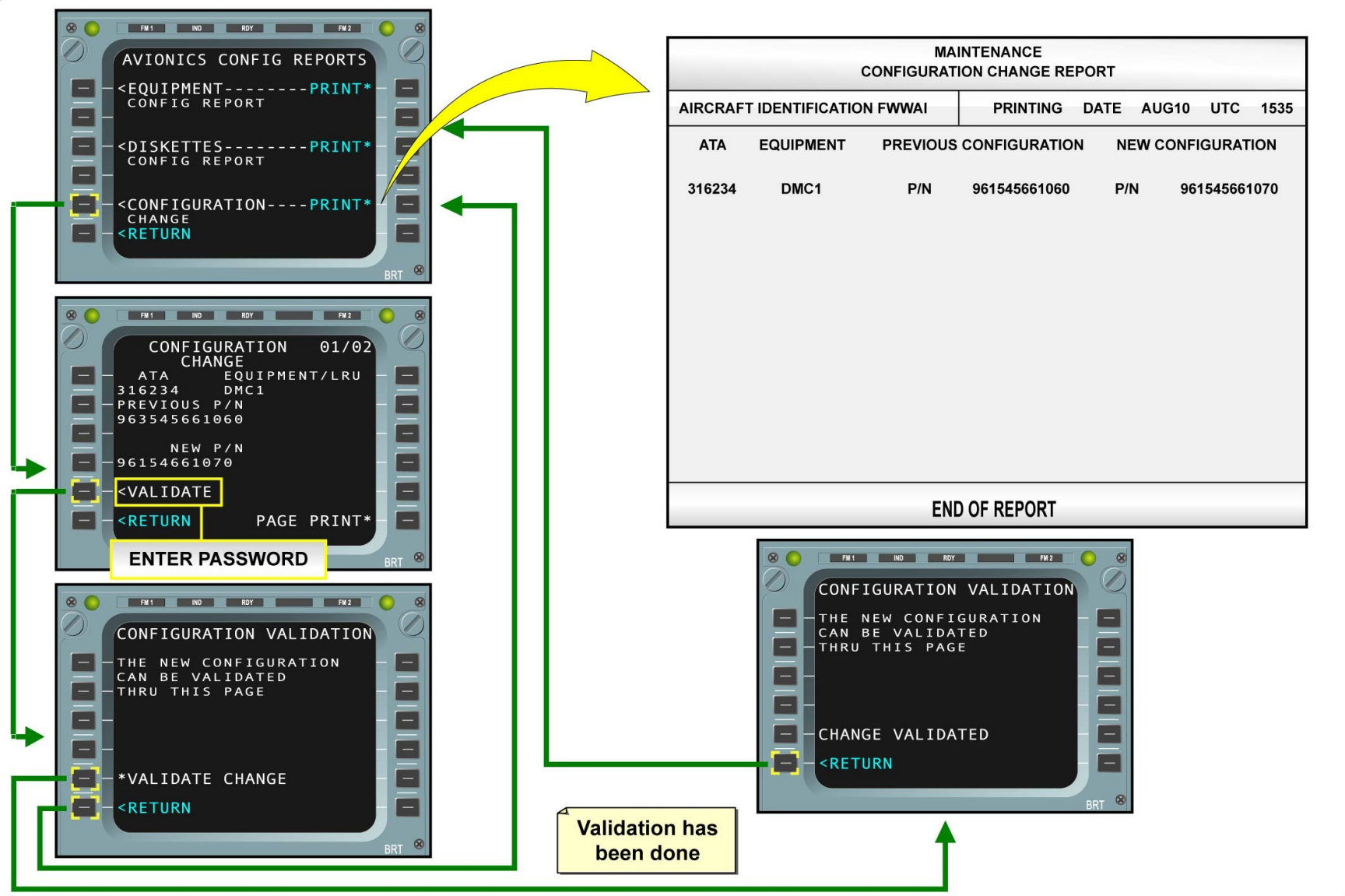
G9409341 - GAUT0T0 - FM45D5F45AA0103

AVIONICS CONFIGURATION REPORTS D/O (3)

CONFIGURATION CHANGE

This function is designed to validate the part number, database number and software reference changes through the CMS, and is presented on the MCDU only if new part numbers are detected by the CMS.
The philosophy is that, if a person changes a computer (new part number), then the change is checked and validated on the MCDU by another person called the controller. The items of equipment that are listed are those for which the change has not yet been validated. A password will be entered to validate the new part number.
After validation, the equipment disappears from the list. It is still available in the Equipment CONFIG Report.
The CONFIGURATION change report can be printed through the MCDU.
The screens and reports are presented as an example.

G9409341 - GAUT0T0 - FM45D5F45AA0103



CONFIGURATION CHANGE

G9409341 - GAUT0T0 - FM45D5F45AA0103

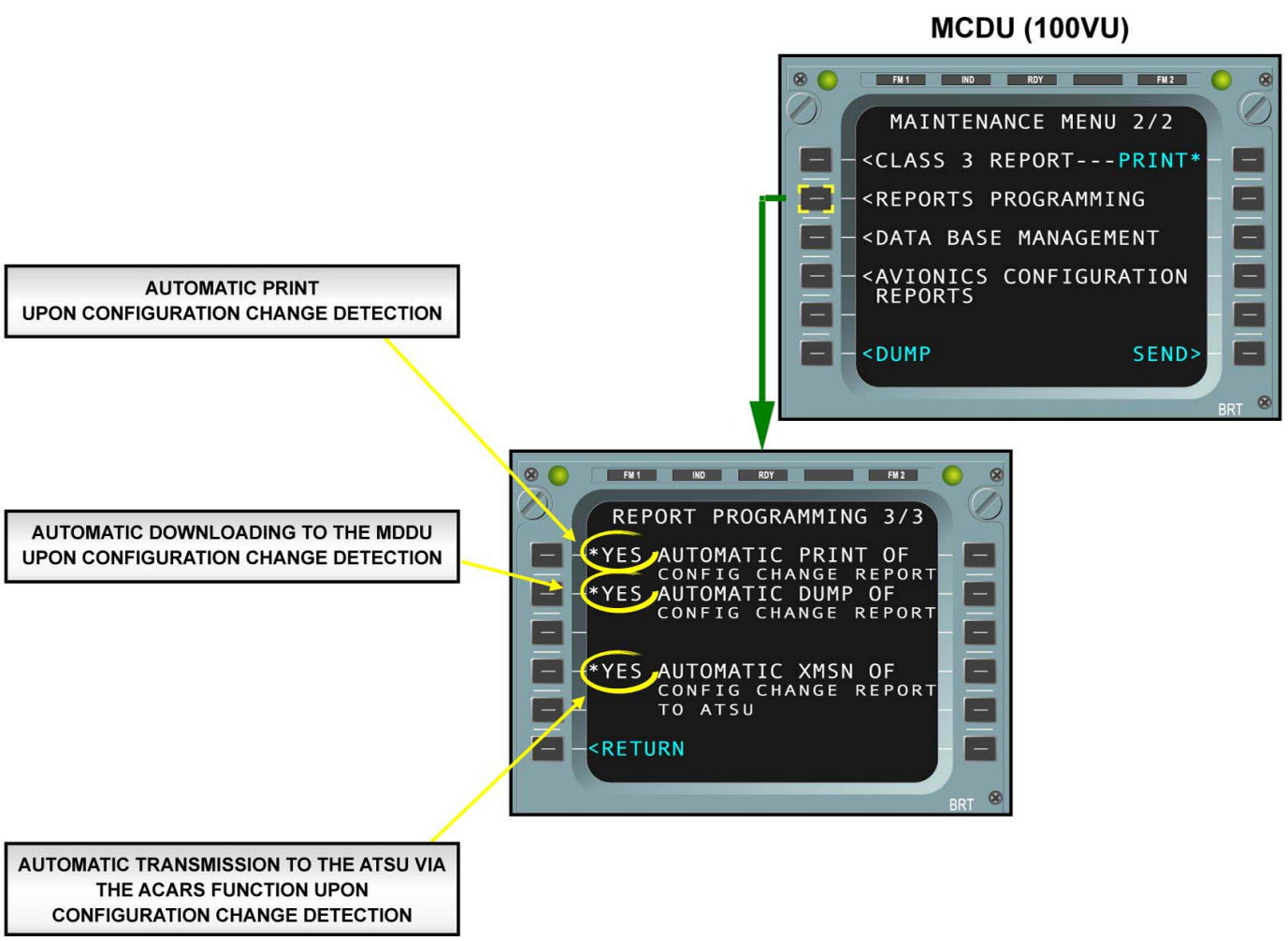
AVIONICS CONFIGURATION REPORTS D/O (3)

PROGRAMMING

- manual control from the MCDU,
- automatic transmission from the internal logics (at each new detected CONFIG),
- request from the ACARS function.

It is possible to program the automatic transmission of the CONFIGURATION CHANGE report, to the printer, the Air Traffic Service Unit (ATSU) via the Aircraft Communication Addressing and Reporting System (ACARS) function, or the data loader.

G9409341 - GAUT0T0 - FM45D5F45AA0103


MCDU (100VU)
MAINTENANCE MENU 2/2
<CLASS 3 REPORT---PRINT*
<REPORTS PROGRAMMING
<DATA BASE MANAGEMENT
<AVIONICS CONFIGURATION REPORTS
<DUMP
SEND>
BRT
REPORT PROGRAMMING 3/3
*YES AUTOMATIC PRINT OF CONFIG CHANGE REPORT
*YES AUTOMATIC DUMP OF CONFIG CHANGE REPORT
*YES AUTOMATIC XMSN OF CONFIG CHANGE REPORT TO ATSU
<RETURN
BRT
AUTOMATIC PRINT UPON CONFIGURATION CHANGE DETECTION
AUTOMATIC DOWNLOADING TO THE MDDU UPON CONFIGURATION CHANGE DETECTION
AUTOMATIC TRANSMISSION TO THE ATSU VIA THE ACARS FUNCTION UPON CONFIGURATION CHANGE DETECTION

PROGRAMMING

PRINTER D/O (3)

GENERAL

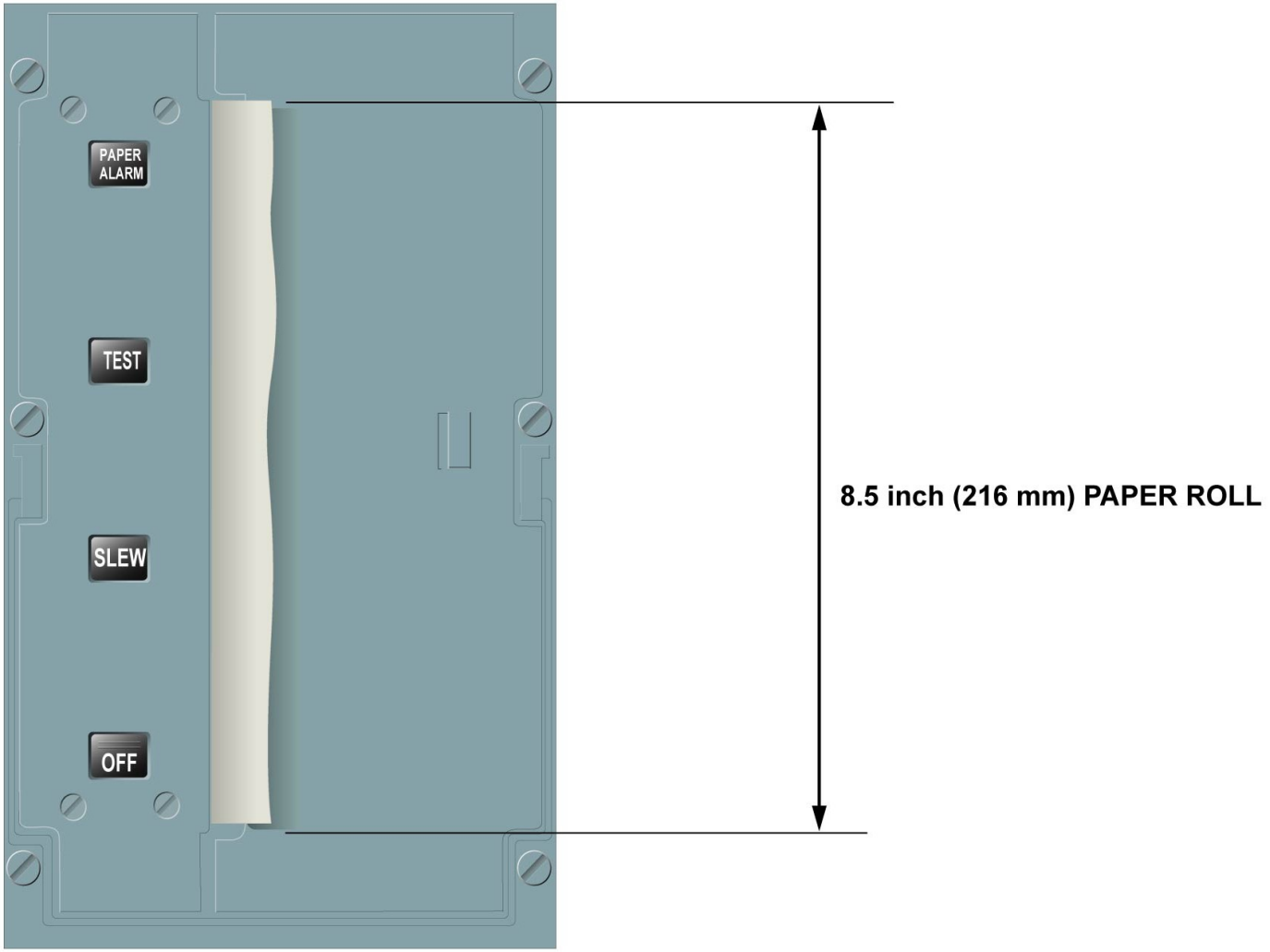
The printer is used for printing system reports. These systems are:
- the Central Maintenance System (CMS),
- the Aircraft Condition Monitoring System (ACMS),
- the Air Traffic and Information Management System (ATIMS),
- the Flight Management Guidance and Envelope System (FMGES),
- the Engine Interface Vibration Monitoring Unit (EIVMU).

It is loaded with an 8.5 inch (216 mm) wide paper roll.

CONTROLS

The printer face features two P/Bs and two annunciator P/Bs. The TEST P/B is used to perform a functional test of the printer.
The SLEW P/B is used to feed the paper out. The PAPER ALARM P/B includes an amber caution light that illuminates if a new paper roll is required. The OFF P/B is used to switch the printer ON or OFF. It includes indicator light bars that illuminate amber if the printer is set to OFF.

G9409341 - GAUT0T0 - FM45D9F45P40302



GENERAL & CONTROLS

PRINTER D/O (3)

SYSTEMS

Several systems can be connected to the printer, which uses a multiplexed input receiver, so that the printer is in communication with only one of the possible source systems at a time. The input data is transmitted on ARINC 429 buses and is ready to be printed. The output data is transmitted on a single low speed ARINC 429 bus to indicate the printer status (ready, busy, etc).
The printer is usually connected to the following systems:
- the Flight Management Guidance and Envelope Computers (FMGECs),
- the Central Maintenance System (CMS),
- the Engine Interface and Vibration Monitoring Units (EIVMUs),
- the Air Traffic Service Unit (ATSU),
- the Aircraft Condition Monitoring System (ACMS).

FLIGHT MANAGEMENT GUIDANCE AND ENVELOPE COMPUTERS

The FMGECs are connected to the printer so the following types of report can be printed:
- flight plans,
- take-off data,
- wind data (defined in the flight plan),
- flight reports (pre-flight, in-flight, post-flight).

The print function allows various Flight Management (FM) reports to be printed, either automatically or manually.

CENTRAL MAINTENANCE SYSTEM

The CMS is connected to the printer in order to print fault reports for maintenance in flight or on ground. When the last engine is shut down, a Post Flight Report (PFR) may be automatically printed. It is possible to print data displayed on the MCDU by pressing the print line select key.

ENGINE INTERFACE AND VIBRATION MONITORING UNIT

Each EIVMU automatically constitutes a report in case of an excessive vibration level or upon a manual request, before the flight, via the CMS in interactive mode. The report is stored in the EIVMU in a volatile memory. Therefore it may be lost before printing in case of a power supply interruption. The report is printed on ground as soon as the engine shuts down. The MCDU page is accessed from the MCDU EIVMU main menu page and allows FREQUENCY ANALYSIS ACQUISITION REQUESTS. When all the values are correctly entered the request is validated, by pressing on the RETURN key.

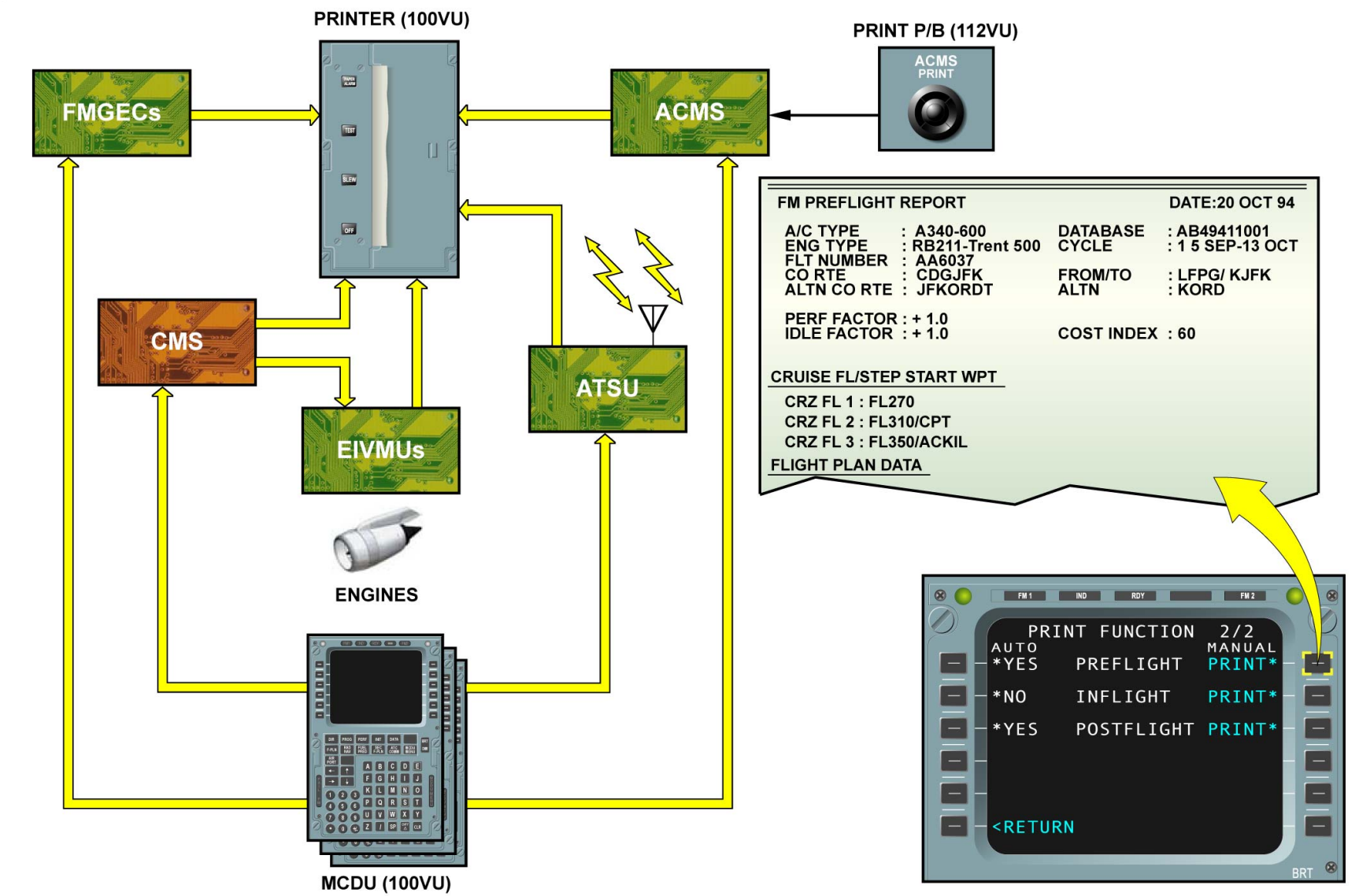
AIR TRAFFIC SERVICE UNIT

The ATSU is connected to the printer in order to print the data elaborated by itself received from the ground and from peripheral computers, and the data entered by the crew via the MCDUs.

AIRCRAFT CONDITION MONITORING SYSTEM

The ACMS collects data from A/C systems and formats it to suit various standard reports, which can be printed. The ACMS report prints can be done manually via the MCDU or automatically. Depending on programming, some reports can be triggered and then printed by the remote ACMS PRINT P/B.

G9409341 - GAUT0T0 - FM45D9F45P40302



SYSTEMS ... AIRCRAFT CONDITION MONITORING SYSTEM

G9409341 - GAUT0T0 - FM45D9F45P40302

UP AND DOWN LOADING D/O (3)

GENERAL

The Data loading system includes:
- a Data Loading Selector (DLS) located on the overhead panel to select the target computer,
- a Multipurpose Disk Drive Unit (MDDU) to upload and download data from or to a disk unit,
- a Data Loading Routing Box (DLRB) to route the input/output data between the disk unit and the target computer.

Note: if the MDDU is not installed, up and down loading functions can be performed through a connector by using a Portable Data Loader (PDL).

The up and down data loading system is defined as an interface between the onboard computers and the ground-based data processing stations (PCs). The system has two functions, a main uploading function and a downloading function. From a data processing media (3.5 inch disk), the onboard computers use the uploading function to update their databases or to modify part of their operational software (no On Board Replaceable Module (OBRM) on the front face of the computers).

The downloading function is used to transfer the data recorded by certain computers during aircraft operation to a 3.5 inch disk. This disk-stored data can be directly analyzed on ground by the airlines.

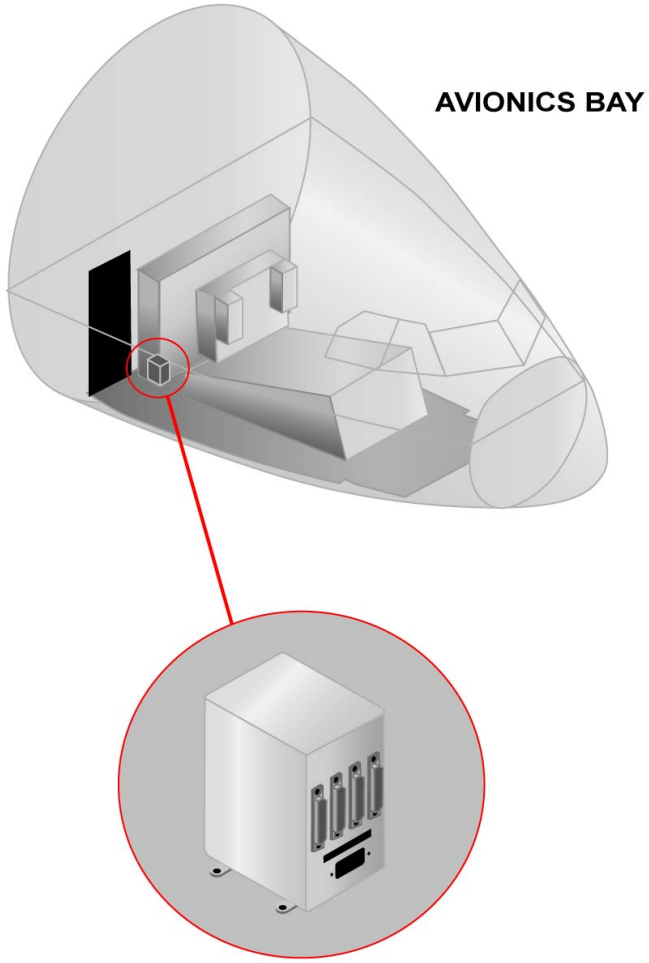
Note that all the computers involved in the system use the uploading function. Only a limited number also use the downloading function.

The Multipurpose Disk Drive Unit (MDDU), the onboard data loader and the onboard computers known as target computers communicate via ARINC 429 data buses. Loading operation is basically controlled by the Data Loading Routing Box (DLRB) by means of the Data Loading Selector (DLS).

G9409341 - GAUT0T0 - FM45DALOADGDO02

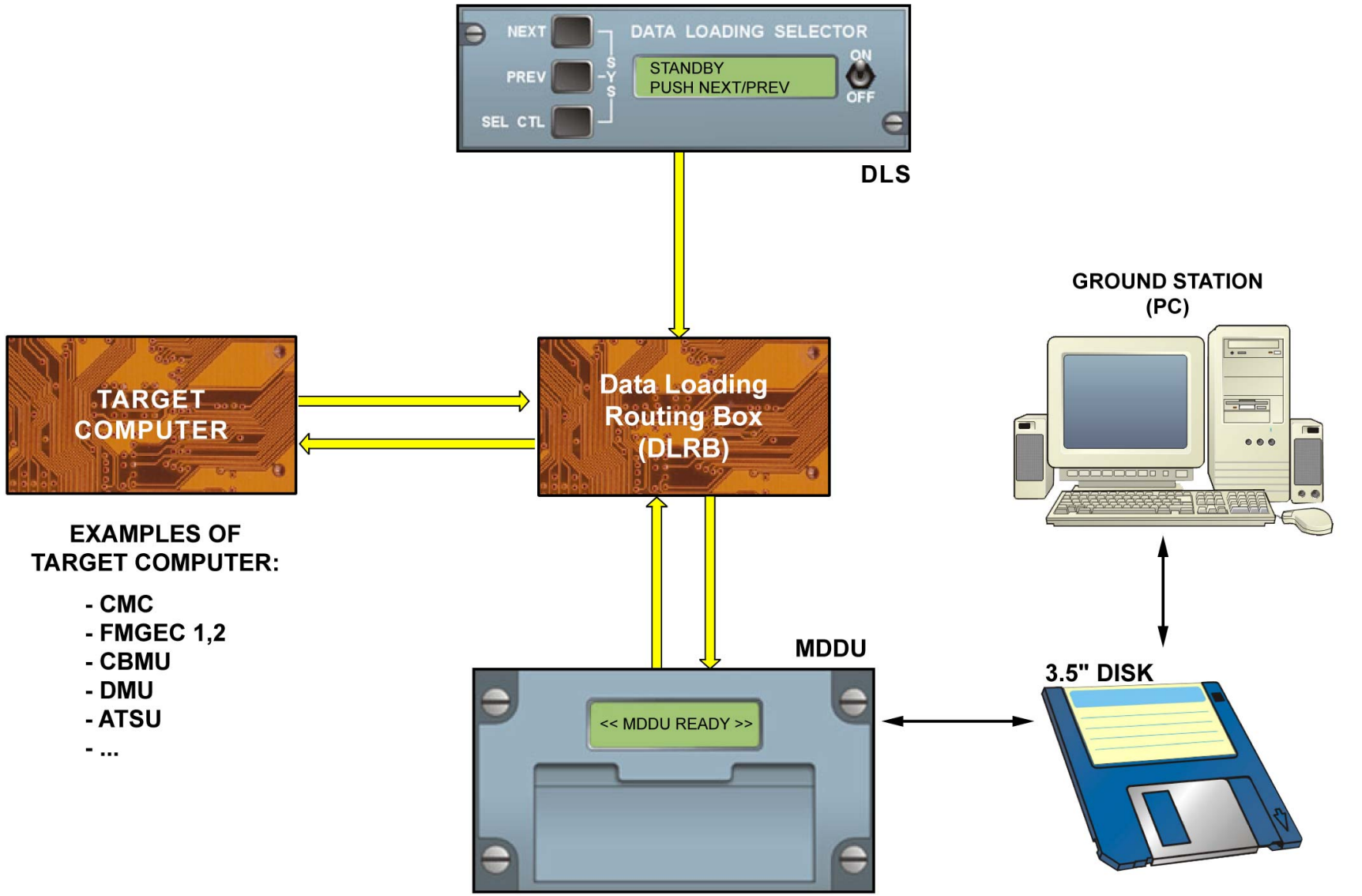
Data Loading Selector (DLS)

Multipurpose Disk Drive Unit (MDDU)



Data Loading Routing Box (DLRB)

GENERAL



GENERAL

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UP AND DOWN LOADING D/O (3)

SYSTEM DESCRIPTION

The Data Loading system is an interface between the aircraft computers and ground data processing equipment used to update software and databases or to retrieve aircraft system data.

DLRB/DLS

The DLRB and the DLS are connected by two RS422 bi-directional serial links (for dialog and maintenance purposes) and two discretes. The DLS sends user commands to the DLRB and displays the result of these commands on its Liquid Crystal Display (LCD) screen. The list of the computers displayed on the DLS is extracted from the DLRB database. This database must be uploaded to fit the aircraft configuration (by selecting the DLRB itself in the list of targets).
The DLRB and the DLS only operate in ground condition. When the right hand main landing gear shock absorber is compressed, a discrete signal is sent by the Landing Gear Control and Interface Unit 1 (LGCIU 1) to enable the systems to operate. Note that the DLS ON/OFF selector switch is used to activate the DLRB through the ON/OFF discrete and not to command the DLS power supply. The DLS power is supplied by the DLRB through the POWER SUPPLY discrete.

LOAD ENABLE

A LOAD ENABLE discrete, depending on the state of the LGCIU 1 discrete signal, is wired to each target computer to enable the loading functions on ground and inhibit them in flight.

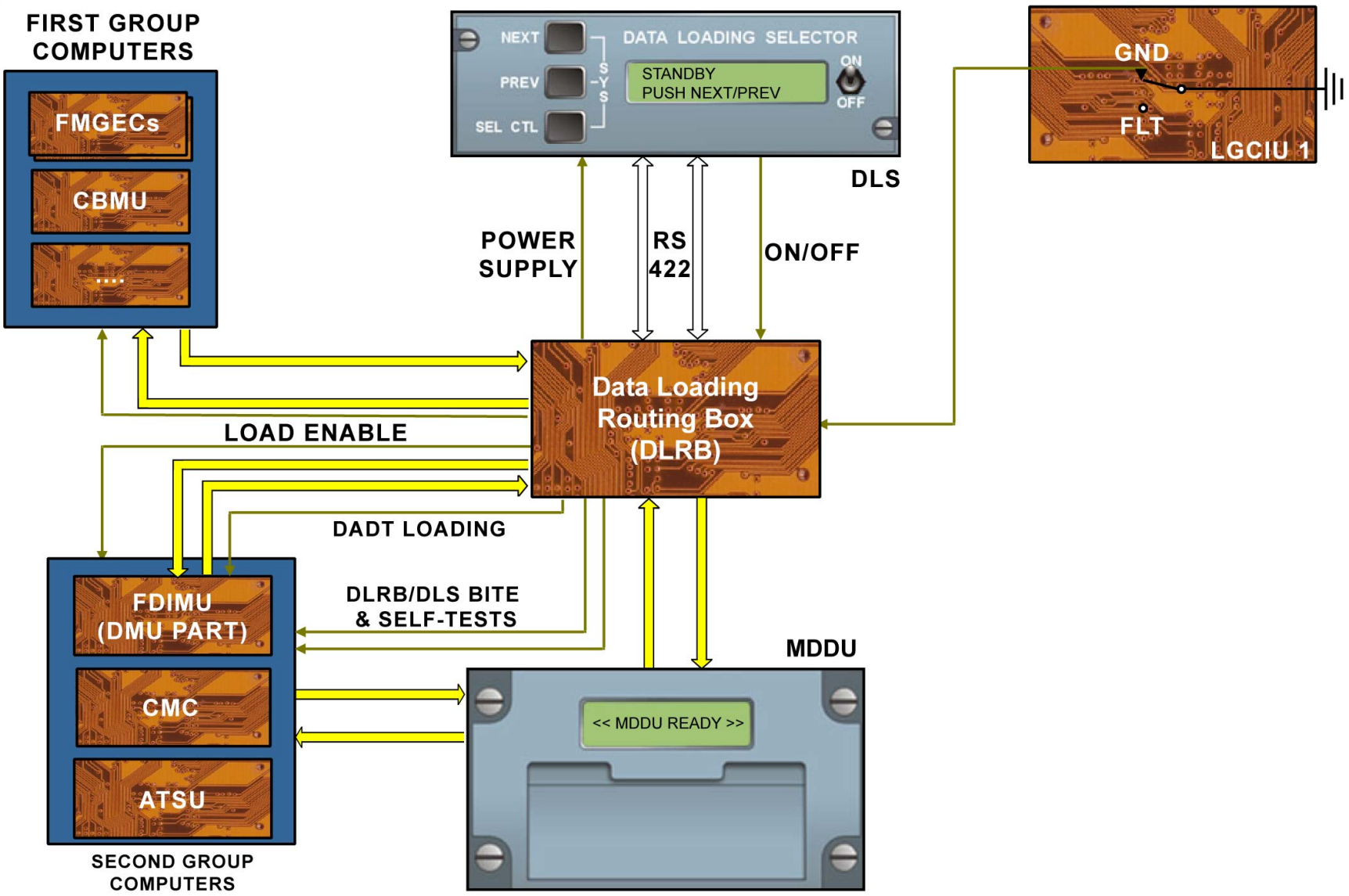
TARGET COMPUTERS

The target computers can be separated into two groups. Most of the computers (up to 26) belong to the first group. These computers are connected to the DLRB by two ARINC 429 buses. The DLRB routes the data to be transferred between the MDDU and the computer selected on the pull-down menu of the DLS.

The three computers belonging to the second group have direct ARINC 429 links with the MDDU. In addition, these computers are internally programmed so that they will not consider the LOAD ENABLE discrete signal for downloading operations. As a consequence, for the computers of the second group, the downloading function is also operational in flight.
The FDIMU computer belonging to the second group has discret and one direct ARINC 429 links with the DLRB in order to permit future upload of DFRS part of FDIMU via DLRB.

SYSTEM TYPES

The DLRB/DLS is a type 3 system. Note that the DLS BITE is first processed by the DLRB (via RS422). The MDDU is a type 2 system with the following particularity: instead of a discrete, from the Central Maintenance Computer (CMC) to MDDU, an ARINC 429 bus is required for downloading operations, which is also used by the CMC to activate the MDDU test.



SYSTEM DESCRIPTION - DLRB/DLS ... SYSTEM TYPES

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UP AND DOWN LOADING D/O (3)

SEMI-AUTOMATIC LOADING OPERATION

The semi-automatic loading mode is used, on ground only, for either uploading or downloading operations. Before performing a semi-automatic loading operation, refer to the relevant procedure for the corresponding system in the Aircraft Maintenance Manual (AMM). The operator actions are limited to:
- first, selecting the target computer on the pull-down menu of the DLS (e.g. FMGEC 1 for NAV database uploading),
- then, inserting in the disk drive the relevant disk containing the configuration file in which the data to be transferred is defined.

1) Until the disk is inserted in the drive, the system is in standby and the "<< MDDU READY >>" message is displayed on the MDDU. Once the disk is inserted, several automatic actions occur with associated MDDU messages.
2) The MDDU is activated and reads the configuration file ("READY" message).
3) The MDDU processes the information contained in the configuration file and a bi-directional protocol dialog is initiated through the ARINC 429 buses between the MDDU and the target computer ("WAIT RESPONSE" message).
4) As soon as the dialog is established, the data is transferred ("TRANSF IN PROG" message).
5) When the data transfer is terminated and no anomalies are detected, the "TRANSF COMPLETE" message is displayed to inform the operator that the transfer is successfully completed.

Then, in case of uploading, the operator has to check on the relevant MCDU page that the reference of the uploaded software corresponds to the software reference of the disk used for uploading. Note that, for semi-automatic downloading, quick and automatic uploading is first performed to configure the target computer before downloading. That is the reason why, whatever the target computer is, semi-automatic downloading is never possible in flight.

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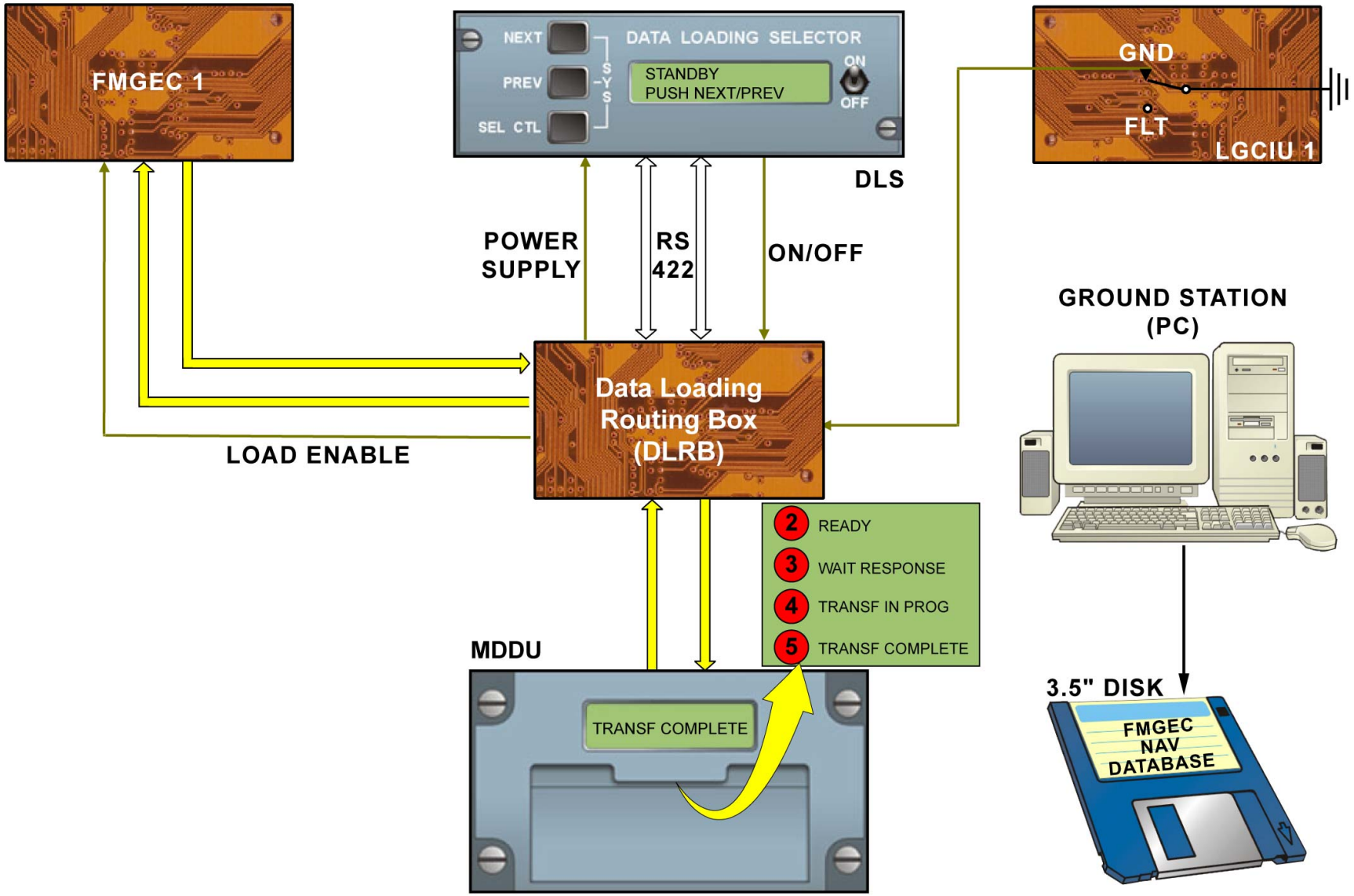

SEMI-AUTOMATIC LOADING OPERATION

G9409341 - GAUT0T0 - FM45DALOADGDO02

UP AND DOWN LOADING D/O (3)

MANUAL LOADING OPERATION

The manual loading mode is only used, either on ground or in flight, for specific downloading operations e.g. POST FLIGHT REPORT DUMP from the CMC or Smart ACMS Recorder (SAR) unload from the Data Management Unit (DMU) part of the Flight Data Interface and Management Unit (FDIMU). A manual downloading operation differs from a semi-automatic downloading operation by the two following main points:

- no selection is made from the DLS and the data to be transferred is manually selected on the relevant MCDU page,
- the configuration file contained in the inserted disk only defines the label of the target computer. Note that, in case of an empty or unformatted disk, downloading is nevertheless possible following a successful identification procedure between the MDDU and the target computer.

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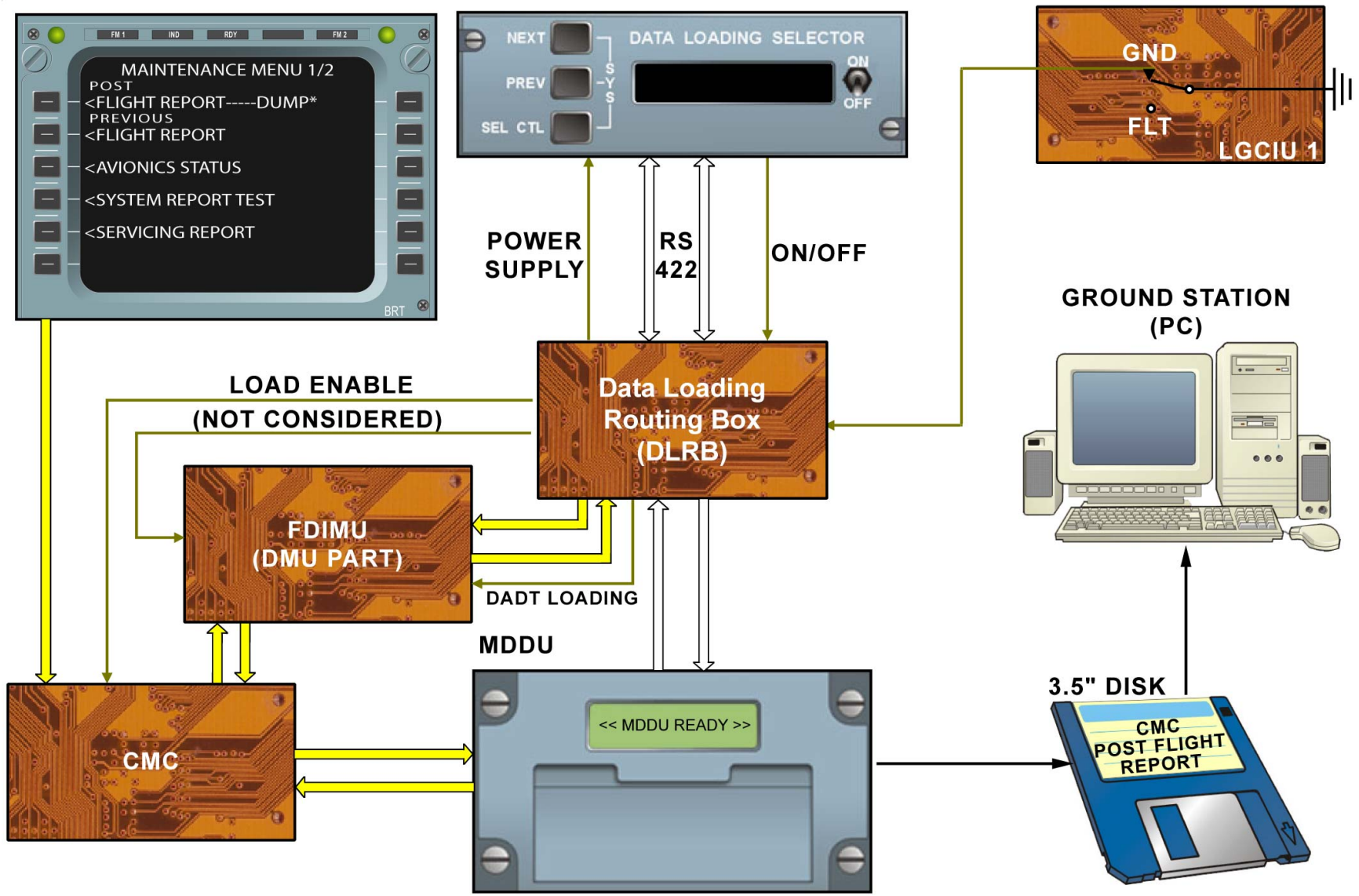

MANUAL LOADING OPERATION

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E-LOGBOOK DESCRIPTION (OPTION) (2)

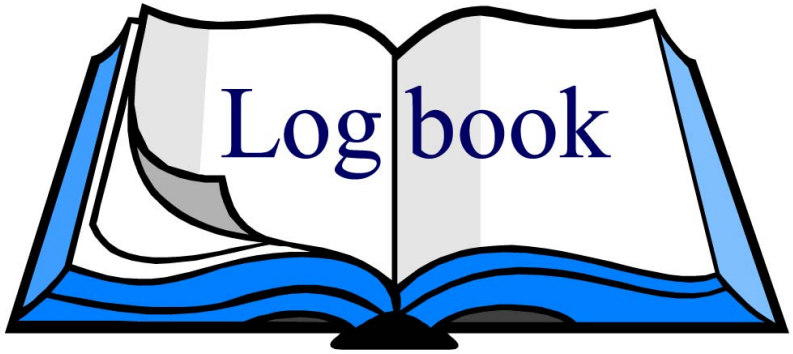
Purpose

Paper-Logbook Comparison

The electronic Logbook (eLogbook) is a modern alternative to the traditional aircraft paper logbook that the airlines are required to use to operate their aircraft. The eLogbook gives the same capabilities as the traditional paper logbook plus additional functions to facilitate and improve flight crew and maintenance staff communication. The e-Logbook is currently an Airbus optional system.

G9409341 - GAUT0T0 - XM00D4LOGBOOK01

eLOGBOOK



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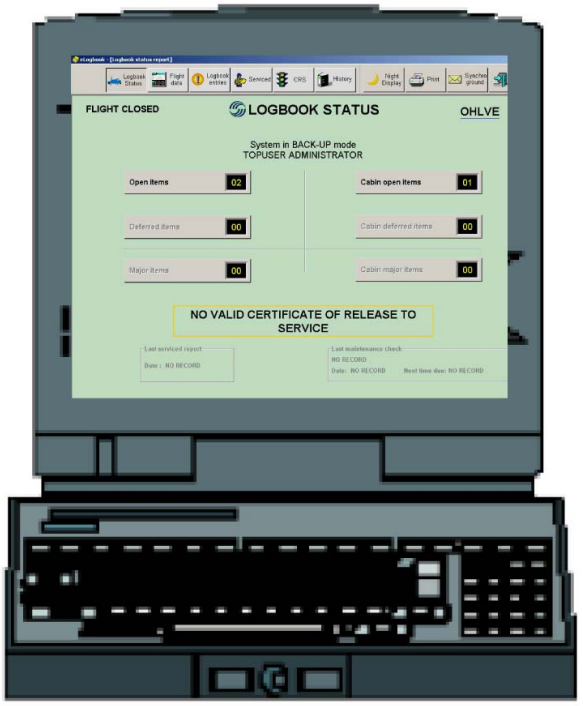


THE eLOGBOOK PROVIDES THE SAME CAPABILITIES AS THE CONVENTIONAL PAPER LOGBOOK PLUS ADDITIONAL FUNCTIONS TO FACILITATE AND IMPROVE FLIGHT CREW AND MAINTENANCE COMMUNICATIONS

PURPOSE - PAPER-LOGBOOK COMPARISON

G9409341 - GAUT0T0 - XM00D4LOGBOOK01

E-LOGBOOK DESCRIPTION (OPTION) (2)

Purpose (continued)

Functions

The eLogbook is the main communication tool for the aircraft operational staff. It enables the flight crew and the technical staff to be aware of the aircraft status, to enter aircraft defects and to report maintenance and servicing actions.

The eLogbook lets the flight crew:

- Consult the Logbook status,
- Accept / create a new flight,
- Report aircraft defects.

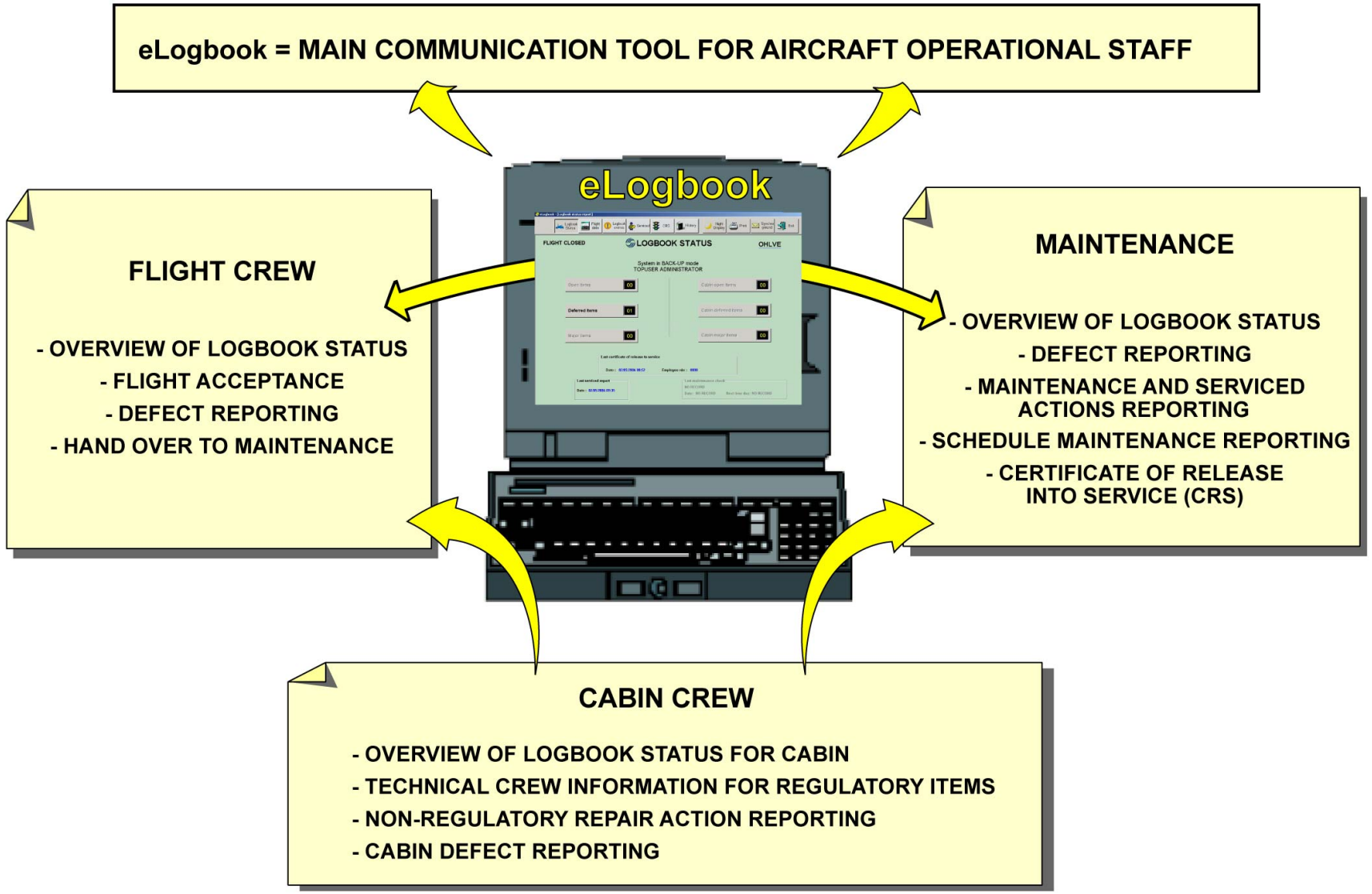
The maintenance staff uses the eLogbook to:

- Consult the aircraft status,
- Report aircraft defects,
- Report corrective or scheduled maintenance actions,
- Report servicing actions,
- Build the Certificate of Release into Service (CRS) of the aircraft.

Finally, the cabin crew can also use the eLogbook to:

- Consult the aircraft status,
- Inform the flight crew about regulatory cabin defects,
- Report non-regulatory cabin defects.

G9409341 - GAUT0T0 - XM00D4LOGBOOK01


eLogbook = MAIN COMMUNICATION TOOL FOR AIRCRAFT OPERATIONAL STAFF
eLogbook
FLIGHT CREW
- OVERVIEW OF LOGBOOK STATUS
- FLIGHT ACCEPTANCE
- DEFECT REPORTING
- HAND OVER TO MAINTENANCE
MAINTENANCE
- OVERVIEW OF LOGBOOK STATUS
- DEFECT REPORTING
- MAINTENANCE AND SERVICED ACTIONS REPORTING
- SCHEDULE MAINTENANCE REPORTING
- CERTIFICATE OF RELEASE INTO SERVICE (CRS)
CABIN CREW
- OVERVIEW OF LOGBOOK STATUS FOR CABIN
- TECHNICAL CREW INFORMATION FOR REGULATORY ITEMS
- NON-REGULATORY REPAIR ACTION REPORTING
- CABIN DEFECT REPORTING

PURPOSE - FUNCTIONS

G9409341 - GAUT0T0 - XM00D4LOGBOOK01

E-LOGBOOK DESCRIPTION (OPTION) (2)

Use Philosophy

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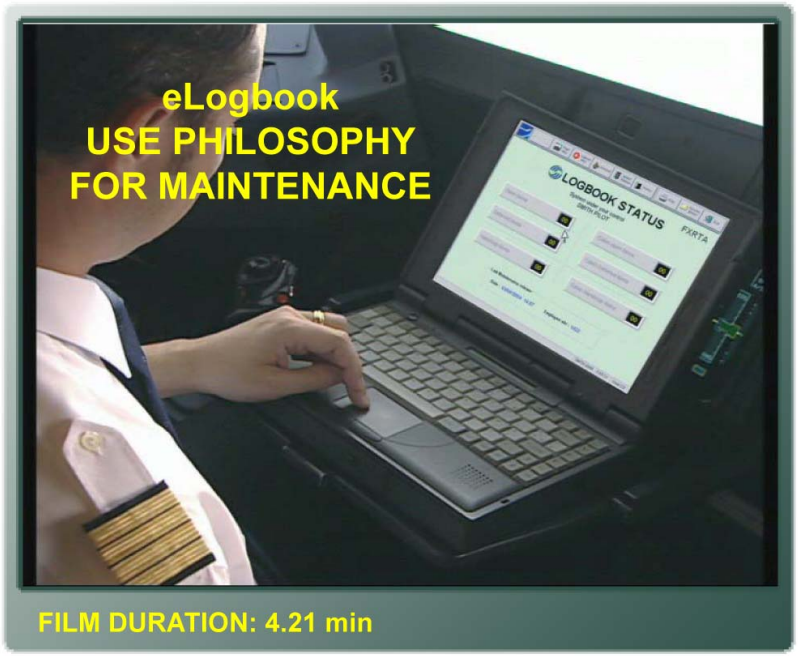


USE PHILOSOPHY

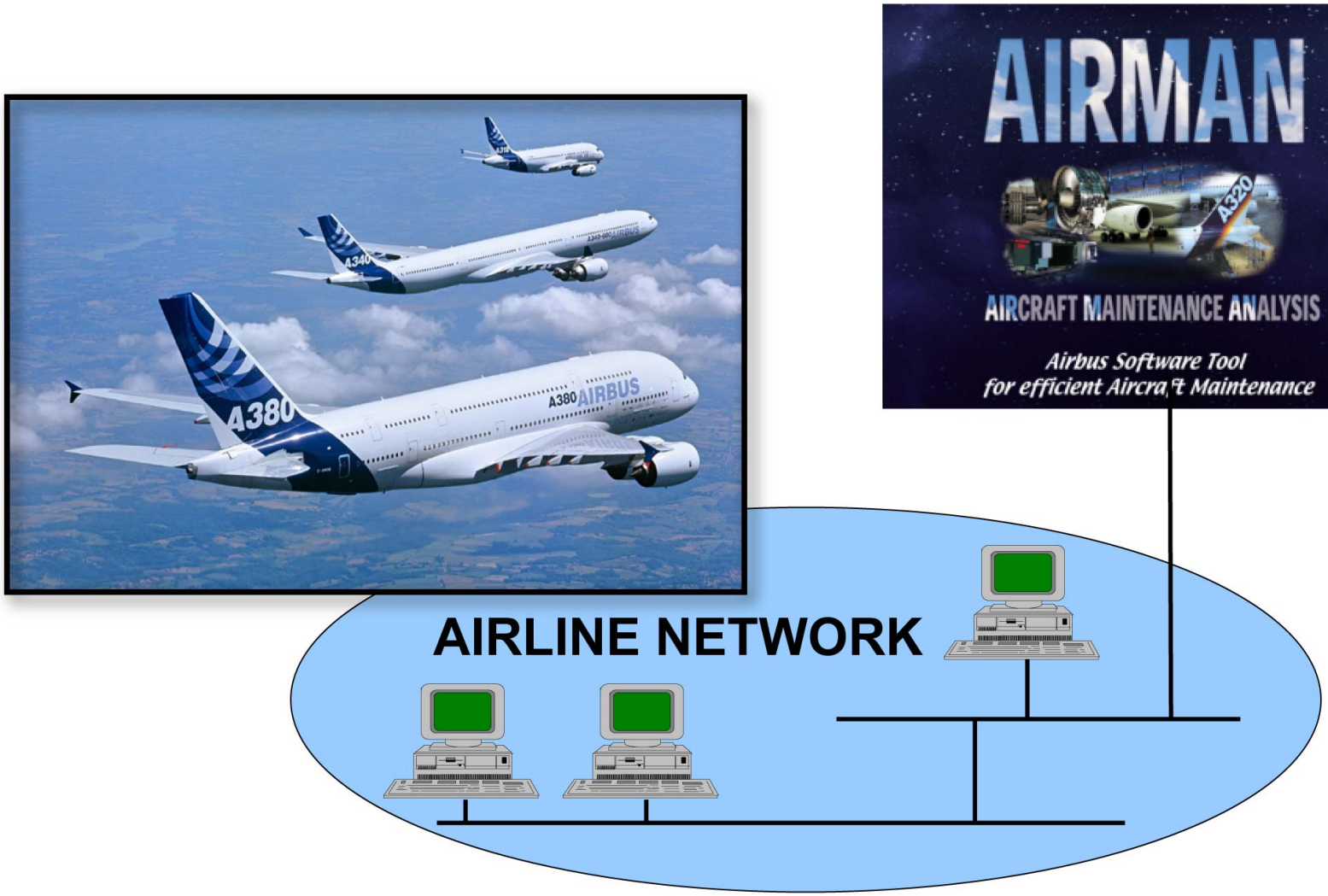
AIRMAN GATE DESCRIPTION (OPTION) (2)

What is AIRMAN

AIRcraft Maintenance ANalysis (AIRMAN) is a ground-based software dedicated to optimize the maintenance of AIRBUS fly-by-wire aircraft composed of:
- On Board Maintenance System (OMS)
- Real-Time Communication System

AIRMAN is also used for the identification and management of unscheduled and scheduled maintenance events.
AIRMAN's data analysis, synthesis and presentation has the following benefits:
- Simpler, more effective troubleshooting
- Preventive maintenance recommendations
- More effective engineering support.

These benefits can be used by the airlines to:
- Improve aircraft Dispatch Reliability
- Reduce operational costs
- Reduce maintenance costs.

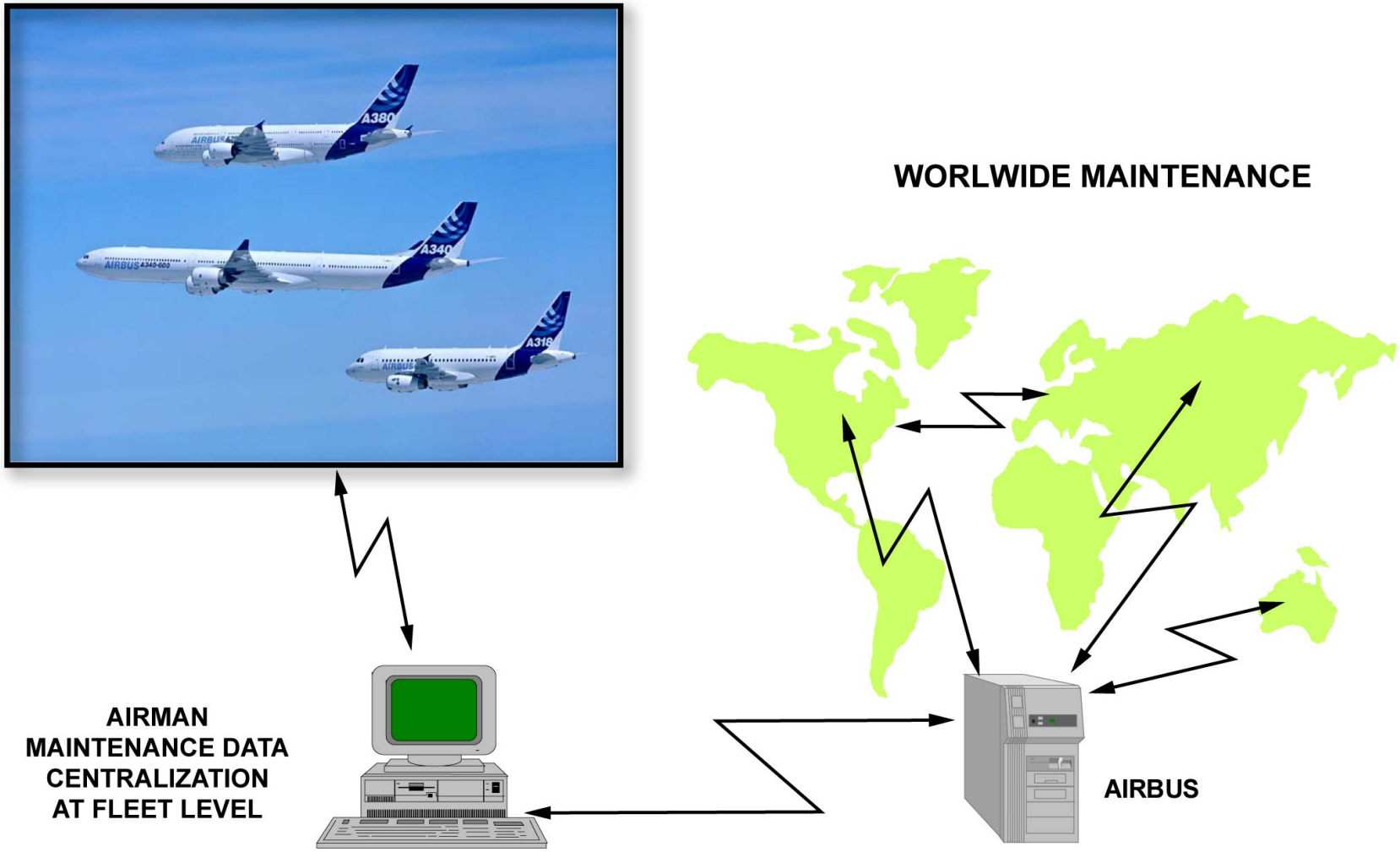


WHAT IS AIRMAN

AIRMAN GATE DESCRIPTION (OPTION) (2)

Functional Overview

AIRMAN is a ground-based software dedicated to the identification and the management of unscheduled maintenance.
AIRMAN receives and analyses the aircraft status information generated by the Onboard Maintenance System (OMS) and also e-logbook data.
The information is automatically transmitted to the ground by the aircraft's communication system.
These information sources are synthesized, combined with Airbus's and the Airline's own technical documentation and presented through a user-friendly interface. Aircraft status information is sent to AIRMAN while the aircraft is both in flight and on ground. Message analysis also takes place in real-time.
These capabilities maximize the time available for appropriate maintenance actions to be determined and preparations to be made.
AIRMAN is capable of analyzing an aircraft's fault history and consequently identifying and prioritizing preventive maintenance actions.



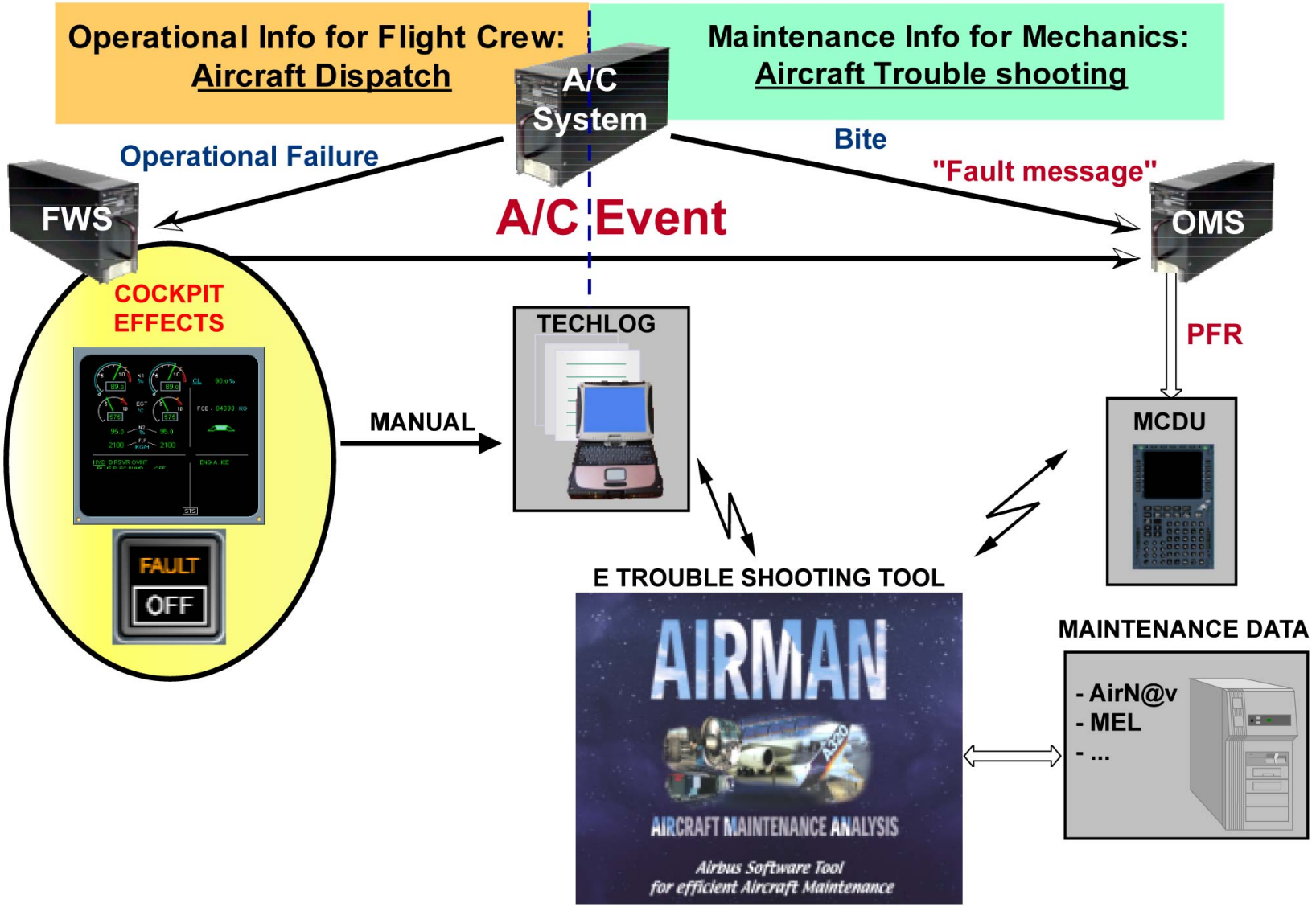
FUNCTIONAL OVERVIEW

G9409341 - GAUT0T0 - XM00D5AIRMAN001

AIRMAN GATE DESCRIPTION (OPTION) (2)

Maintenance Philosophy

The aircraft maintenance philosophy is based on the following steps:
- Fault detection made by the computers BITEs
- Cockpit effects as flags on Display Units, and warning generated by the Flight Warning System (FWS)
- Centralization and correlation by the Onboard Maintenance System (OMS) of BITE faults, cockpit effects and related maintenance procedures
- Generation of Post Flight Report (PFR)
- Fault event data reporting through the eLogbook
- Fault event data and reports transmission to AIRMAN for maintenance support on ground



MAINTENANCE PHILOSOPHY

AIRMAN GATE DESCRIPTION (OPTION) (2)

AIRMAN Links

AIRMAN maintenance analysis is based on the following received data:
- Aircraft data
- Airbus data
- Airline data

Aircraft data:
- Cockpit and cabin effects
- Fault messages
- Logbook entries
- Operational reports (CFR, PFR, ACMS Reports)

Airbus data is made of an aircraft knowledge database build up with the airline worldwide feedback and aircraft documentation:
- TFUs
- SILs
- MMEL/MEL
- AirN@V

Airlines data can be:
- Technical entries (related to A/C events)
- Work orders

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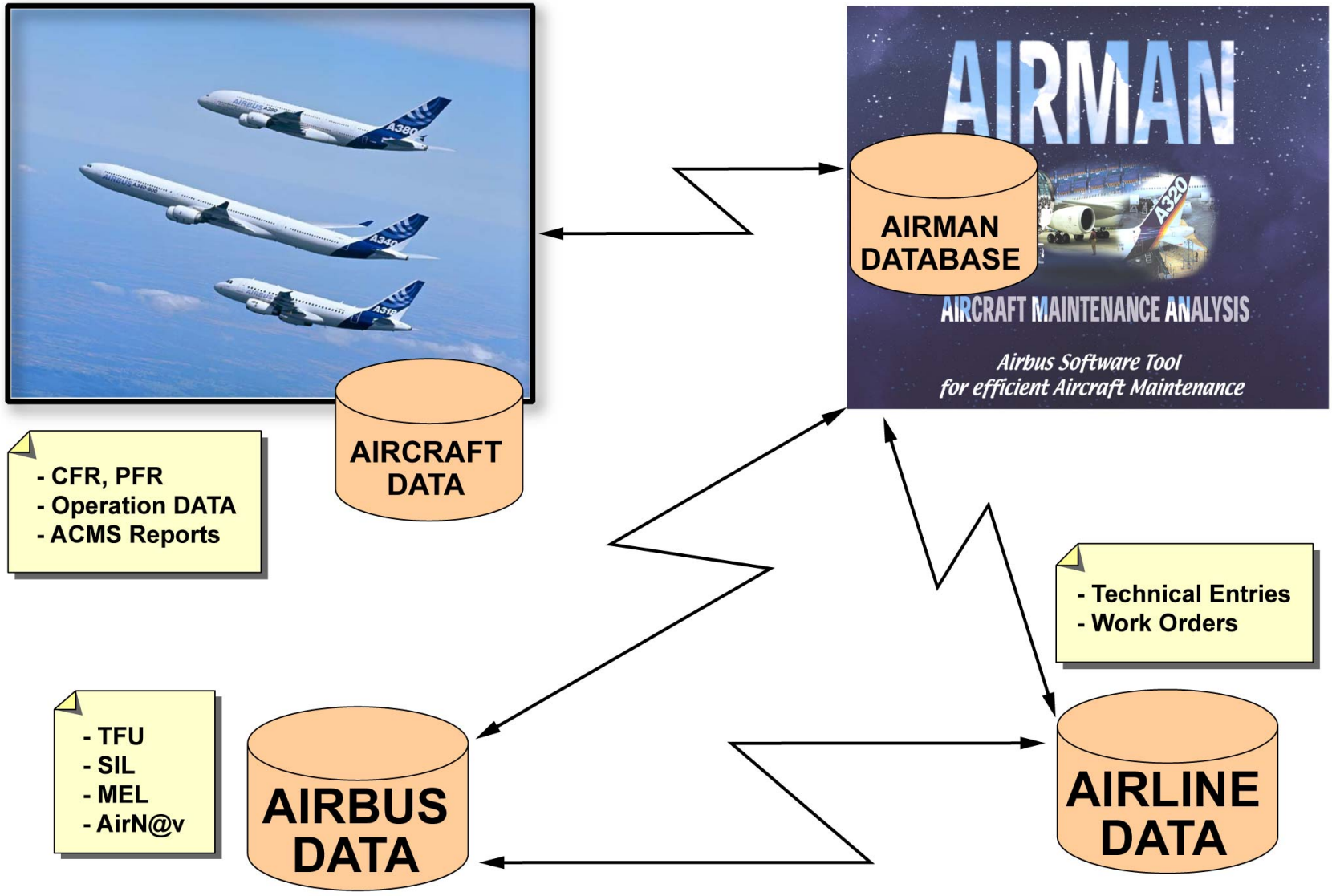


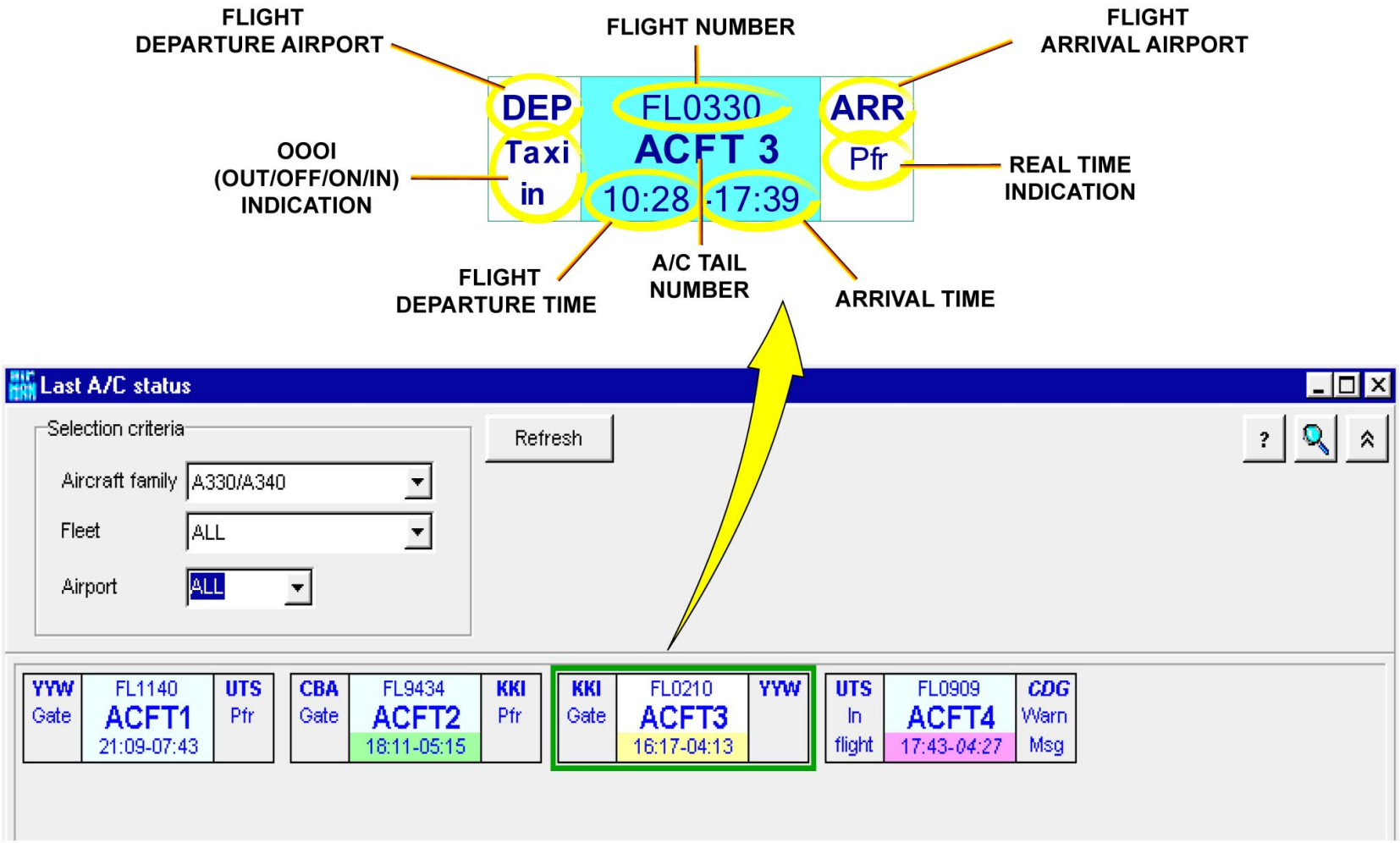
AIRMAN LINKS

G9409341 - GAUT0T0 - XM00D5AIRMAN001

AIRMAN GATE DESCRIPTION (OPTION) (2)

Last A/C Status - Flight Box

On the "Last A/C Status" Page, each flight is represented by a flight box.
A flight box indicates:
- The flight departure airport
- The flight number
- The flight arrival airport
- The OOOI (OUT/OFF/ON/IN):
* OUT: "Out of gate"
* OFF: "Lift off"
* ON: "On ground"
* IN: "In gate"
- Flight departure time
- Aircraft tail number
- Flight arrival time
- Real-time indication



LAST A/C STATUS - FLIGHT BOX

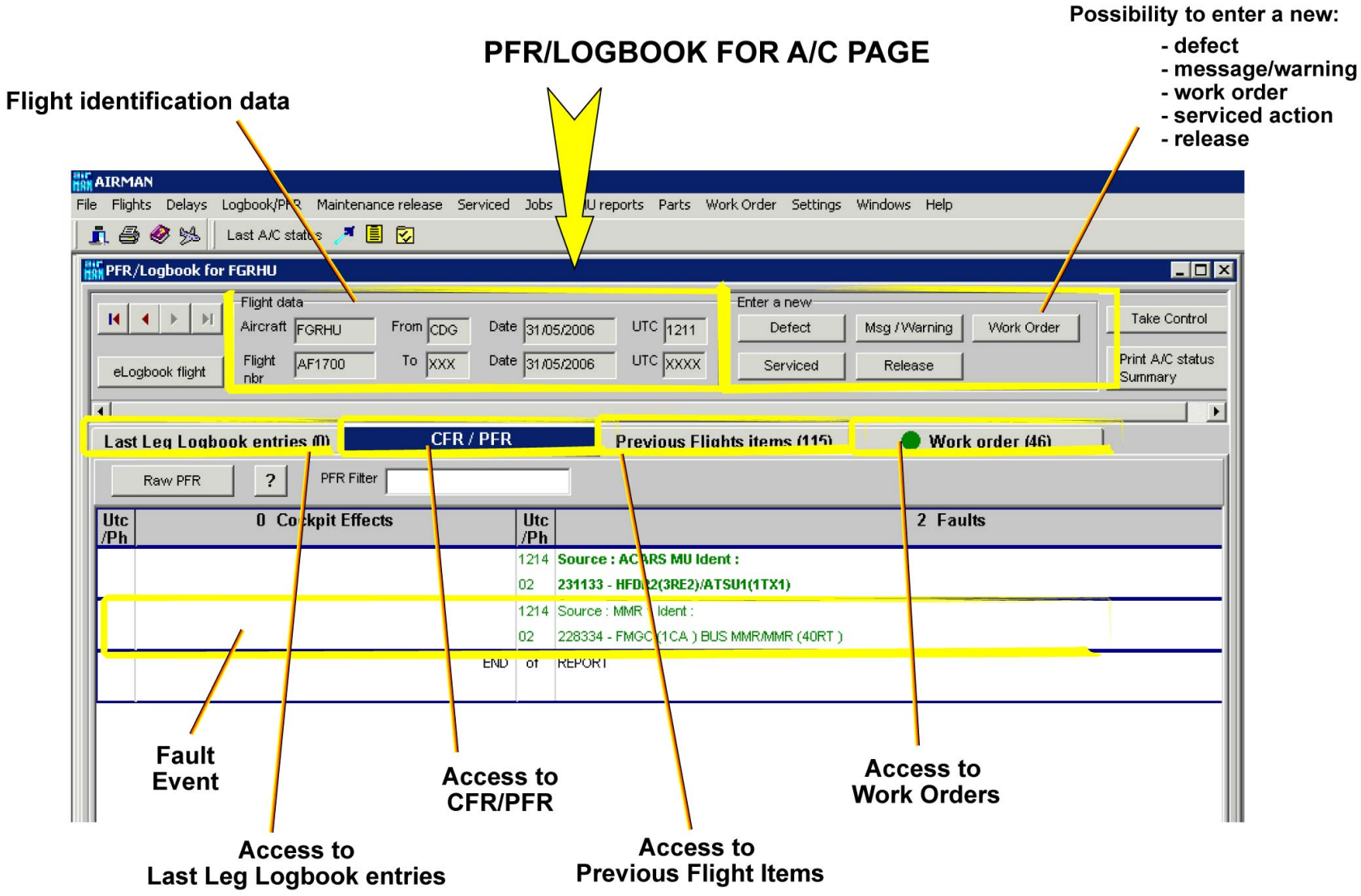
AIRMAN GATE DESCRIPTION (OPTION) (2)

PFR/LOG for Aircraft

The "PFR/Logbook" Page for a particular aircraft displays:
- The last leg logbook entries
- The Current Flight Report (CFR)/Post Flight Report (PFR)
- The previous flight items
- The work orders related to the A/C

The page also permanently displays all flight related data.
In addition, the page enables to enter new:
- Defects
- Fault messages/warnings
- Work orders
- Serviced items
- Maintenance release

The CFR/PFR sub-function shows all current or post flight related fault events and related data.



PFR/LOG FOR AIRCRAFT

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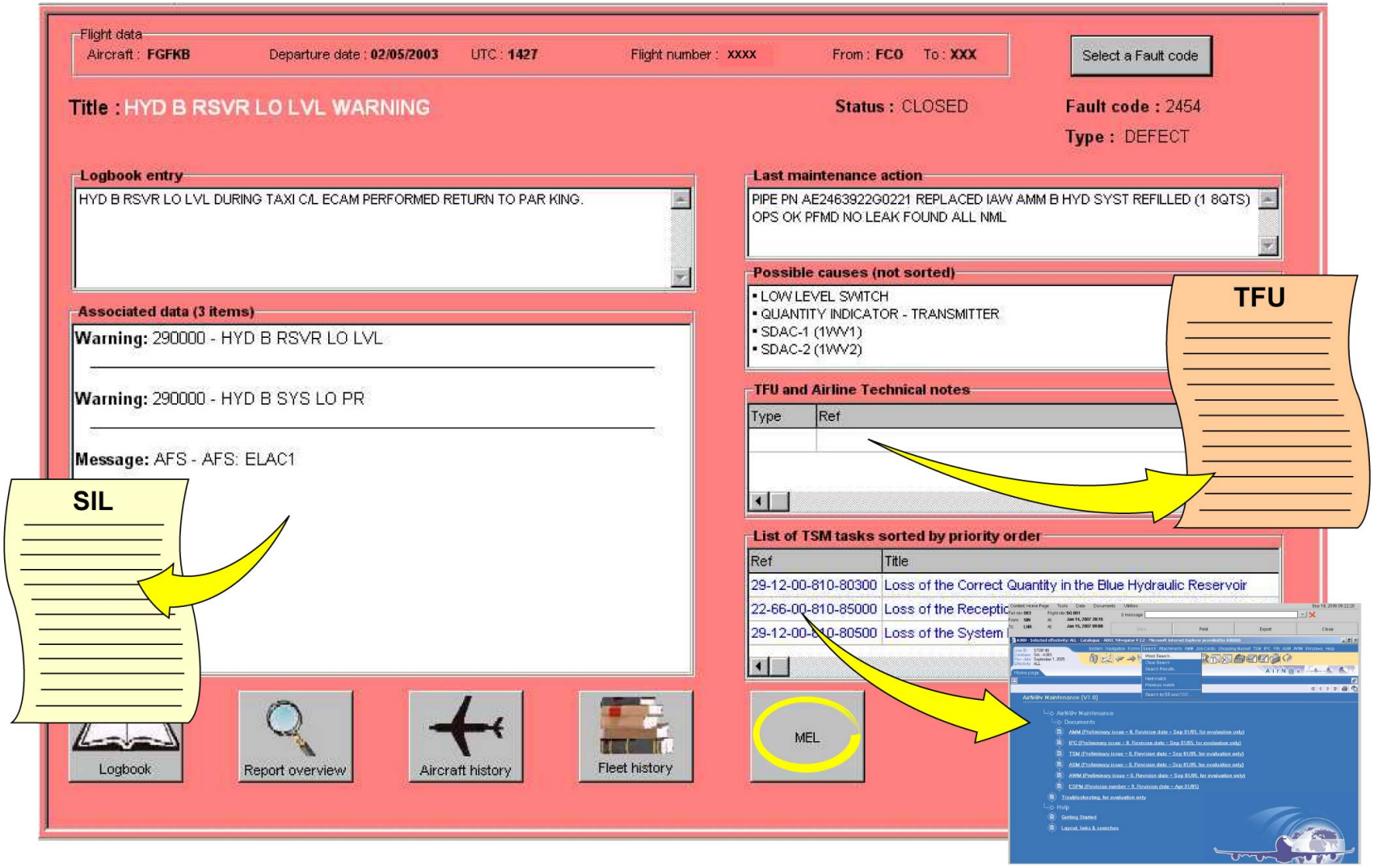
AIRMAN GATE DESCRIPTION (OPTION) (2)

Advisor

The third data source used by AIRMAN to make the maintenance easier is Airbus data. Airbus data is made of an aircraft knowledge database build up with the airline worldwide feedback and aircraft documentation:
- TFUs
- SILs
- MEL
- AirN@V

This data are implemented in the AIRMAN database and correlated to a unique fault event. They can be accessed directly from the "Defect Advisor".


Flight data
Aircraft : FGFKB
Departure date : 02/05/2003
UTC : 1427
Flight number : XXXX
From : FCO
To : XXX
Select a Fault code
Title : HYD B RSVR LO LVL WARNING
Status : CLOSED
Fault code : 2454
Type : DEFECT
Logbook entry
HYD B RSVR LO LVL DURING TAXI C/L ECAM PERFORMED RETURN TO PAR KING.
Last maintenance action
PIPE PN AE2463922G0221 REPLACED IAW AMM B HYD SYST REFILLED (1 8QTS)
OPS OK PFMD NO LEAK FOUND ALL NML
Possible causes (not sorted)
• LOW LEVEL SWITCH
• QUANTITY INDICATOR - TRANSMITTER
• SDAC-1 (1WV1)
• SDAC-2 (1WV2)
TFU
Associated data (3 items)
Warning: 290000 - HYD B RSVR LO LVL
Warning: 290000 - HYD B SYS LO PR
Message: AFS - AFS: ELAC1
TFU and Airline Technical notes
Type
Ref
SIL
List of TSM tasks sorted by priority order
Ref
Title
29-12-00-810-80300
Loss of the Correct Quantity in the Blue Hydraulic Reservoir
22-66-00-810-85000
Loss of the Receptic
29-12-00-810-80500
Loss of the System
Logbook
Report overview
Aircraft history
Fleet history
MEL

ADVISOR

AIRBUS

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STM
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